THE

NAUTILUS.

A MONTHLY JOURNAL
DEVOTED TO THF INTERESTS OF
CONCHOLOGISTS.

VOL. XIII.

MAY, 1899, to APRIL, 1900.

PHILADELPHIA :

Published by H. A. PILSBRY and C. W. JOHNSON.

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The Nautilus.

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A LIST OF THE LAND AND FRESH-WATER SHELLS OF MANITOBA.

BY A. W. HANHAM, WINNIPEG, MAN.

When I commenced collecting here in 1894, my enthusiasm was soon checked by the dearth of land shells, in which, since I first collected, I have been particularly interested. In fresh-water species things were different, as this list shows, but I have never felt the same interest in them, and my work here, as far as they are concerned, has been half-hearted, and I have done nothing at all during the past two seasons. Under these circumstances, I have thought it advisable to publish this list before my records get lost or destroyed. The most striking feature here (even after Quebec) was the utter absence of all the larger species of land shells (with the exception of the Succineas), and the scarcity of even the small kinds which have been taken. However, I am still impressed with the idea that some few of the larger species may occur, rarely perhaps, in the well-wooded districts lying in the extreme east, southeast and northeast of the Province. The country I have worked here has been mostly prairie, even though swampy or wooded in places, and really almost the only localities worth exploring are the river "bottoms." Water shells, especially by contrast, are quite conspicuous; the sand dredged from the Red river for building purposes contains a mass of Sphæria, and along the river banks the large valves of Unionеs are very noticeable. The railway ditches and sluices, which are generally dry early in the summer, have in their bottoms a mass of Limnæa, Aplexa and

small Planorbis. Often large areas of prairie, inundated during the spring, are covered with these dead shells, which are the "land" shells of the novice.

Soon after my arrival in Manitoba, I received a good deal of assistance from the Rev. George W. Taylor, of Gabriola Island, B. C., who kindly furnished me with lists of the species he had taken here in 1893, during a flying visit; also any other records or lists of Manitoba species that he knew of.

The lists furnished were as follows:

His own from Winnipeg in 1893.

Condray's, also from Winnipeg.

Hollands', from Norquay, Man.

Bells', Christy's, Dawson's, all from Winnipeg eastward.

(The species taken by Condray and Holland being in his own collection.)

All these records are included in the subjoined list. Dr. V. Sterki, Mr. Ed. W. Roper, Mr. Jas. H. Ferriss and others, have kindly helped in the identification of the more troublesome things of my own taking. The numbers before the land shells (following Mr. H. A. Pilsbry's valuable catalogue), show that our local or provincial species are few and far between.

(47. *Acanthinula harpa* Say.) This species has been taken along the north of Lake Superior, both West as well as East, and I feel sure is to be found in the northern unexplored parts of the province.

48. *Vallonia pulchella* Müll. (Condray, Holland, Taylor, etc.)

50. *Vallonia costata* Müll. Taken here under stones, etc., along railway banks.

(Dr. Sterki remarks of these *costata*, "a beautiful and interesting form with rather crowded ribs.")

53. *Vallonia gracilicosta* Reinh. Winnipeg in 1893, by Taylor.

180. *Strobilops labyrinthica* Say. (Christy and Holland.)

186. *Bifidaria armifera* Say. Very rare here, also taken by Taylor. A rather small form occurs at Brandon; very few were taken.

187. *Bifidaria contracta* Say. From Carberry, by Christy.

188. *Bifidaria holzingeri* Sterki. Rather plentiful here in the Spring of 1894 in Red River drift. Also taken by Condray and Taylor.

199. *Bifidaria pentodon* Say. A few taken here, also recorded by Condray and Taylor. (Dr. Sterki writes "somewhat different from the typical figure, the last whorl comparatively small.")

219. *Vertigo binneyana* Sterki. Rare here, also taken by Condray.

222. *Vertigo ovata* Say. Not uncommon here.

Vertigo sp. (2 examples) Winnipeg. (Dr. Sterki writes, "in size, shape and striation much resembles *V. gouldii* Binn., but there is a peculiar, very strong callus in the palate.")

235. *Cochlicopa lubrica* Müll.(F. subcylindrica, Linn.) Well distributed and not uncommon.

254. *Vitrina limpida* Gld. A few on "toad-stools" late in the fall. Several other records.

260. *Vitrea hammonis* Ström. (H. radiatula Ald.) From all points recorded.

264. *Vitrea binneyana* Morse? A few shells taken at Brandon, were recorded as this species. They have been mislaid, or would have been referred to Dr. Sterki.

270. *Vitrea indentata* Say. From Pine Creek, by Christy.

278. *Conulus fulvus* Müll. Plentiful locally. (Dr. Sterki says, "different to the usual form.")

282. *Zonitoides nitidus* Müll.? Some dead shells from river drift may be this species.

283. *Zonitoides arboreus* Say. From all points recorded.

290. *Zonitoides minusculus* Binn. A few dead shells from Red River drift. (Also Red River, Binney's Manual.)

294. *Zonitoides milium* Morse. Very rare here.

316. *Agriolimax campestris* Binn. Seen occasionally in this district, not included in the other lists.

344. *Pyramidula striatella* Anth. Plentiful, in all lists.

346. *Helicodiscus lineatus* Say. Recorded by Condray. I have taken one or two shells here.

348. *Punctum pygmæum* Drap. Taken here, not included in other lists.

358. *Succinea retusa* Lea. (S. ovalis Gld.) My Winnipeg specimens are all small. (Christy, Dawson and Holland.)

360. *Succinea haydeni* W. G. Binn. (Dawson.)

361. *Succinea hawkinsi* Baird. Carberry. (Christy.)

362. *Succinea obliqua* Say. From all points recorded.

366. *Succinea grosvenorii* Lea. (S. lineata Binn.) Wood Mountain (Dawson).

367. *Succinea avara* Say. Rather common here. (Christy, Dawson and Taylor.) Var. *vermeta* Say? (Referred to this by Dr. Sterki.) A small colony taken under logs on railway bank near the city. (If only S. avara, then an unusually large coarse form.)

370. *Succinea oregonensis* Lea. (A few examples referred to this species by Dr. Sterki). From Winnipeg.

Carychium exiguum Say. } By no means abundant here. (Named
" *exile* Lea. } by Dr. Sterki.)

Sphærium sulcatum Lam. (Christy, Dawson and Holland.)

" *solidulum* Prime. Common here in Red River. (Also recorded by Christy & Dawson.)

Sphærium striatinum Lam. (Christy & Dawson.)

" *stramineum* Conrad. (Dawson).

" *rhomboideum* Say. (Christy & Dawson.)

" *jayanum* Prime. (Christy.)

" *tenue* Prime. Souris River (Dawson).

" *transversum* Say. Playgreen Lake (Bell).

" *simile* Say. A single valve was in a lot of *S. solidulum* referred to Mr. Ed. W. Roper for naming.

Sphærium partumeium Say. (Dawson.) One specimen taken here, kindly named by Mr. Roper.

Pisidium virginicum Gmel. Lake of the Woods (Dawson).

" *variabile* Prime. Pine Creek (Christy).

" *abditum* Hald. (Holland).

" *ferrissii* Sterki. These are the only Pisidia I have found here, and I took a small colony of them in moss in a dried-up swamp late in the year. Only a few appeared to be full grown (named by Dr. Sterki).

Unio alatus Say. Have taken some fine shells along the banks of the Red River here. (Christy & Dawson).

Unio asperrimus Lea. A few from Red River here. (Christy).

" *borealis* A. F. Gray. Lake of the Woods (Christy).

" *canadensis* Lea. (Taylor.)

" *boydianus* Marsh. Red River here. Kindly named by Mr. Ferriss.

Unio gracilis Barnes. Not uncommon in Red River.

" *lachrymosus* Lea. (Bell, Dawson & Taylor.)

" *ligamentinus* Lam. Roseau River (Dawson).

" *hippopeus*, I understand from Mr. Ferriss that this species has been taken in Lake Winnipeg.

Unio luteolus Lam. Red River. (Christy, Dawson & Taylor.)

" *multiplicatus* Lea. (Christy.)

" *occidens* Lea.? Red River.

" *plicatus* Lesueur. (Bell & Christy.)

" *radiatus* Lam. (Bell.)

" *rectus* Lam. Some large specimens, with beautiful nacre, have been taken from the Red River here. (Christy, Dawson & Taylor.)

Unio rubiginosus Lea. Common in Red River. (Christy, Dawson & Taylor.)

Unio spatulatus Lea. (Red River, by Dawson.)

" *subovatus* Lea.? (Dawson.)

" *undulatus* Barnes. (Christy, Dawson & Taylor.) Appears to be common in Red River.

Margaritana complanata Barnes. (Bell & Dawson.)

" *rugosa* Barnes. (Dawson.)

Anodonta ferussaciana Lea. Lake of the Woods. (Dawson.)

" *footiana* Lea. Souris River. (Dawson.)

" *plana* Lea.? I sent a shell to Mr. Ferriss, which he considered this species.

Anodonta subcylindracea Lea. (Holland.)

" *undulata* Say. (Bell & Dawson.)

Valvata tricarinata Say. Rare here. (Christy & Dawson.)

" *sincera* Say. (Christy & Dawson.)

Campeloma decisum Say. Rare here. (Lake of Woods, Dawson.)

Bythinella obtusa Lea. Winnipeg (also by Condray here).

Amnicola porata Say. Lake of the Woods. (Dawson).

" *pallida* Hald. (Christy & Dawson.)

" *granum* Say. Pine Creek. (Christy.)

Limnæa stagnalis L. I have taken a few dead shells along the Assiniboine River here. Also included in the other lists.

Limnæa decollata Mighels. Lake of the Woods (Dawson.)

" *megasoma* Say. Echimamish River (Bell).

" *palustris* Müll. On all the lists. Some shells which I think belong to this species are very prettily lined. This form is rather abundant in some of the marshes.

Limnæa catascopium Say. Lake Manitoba, etc. Also on Dawson's list.

Limnæa caperata Say. On all the lists.

" *desidiosa* Say. Winnipeg. Also by Christy.

" *humilis* Say. Winnipeg. Also by Christy and Dawson.

Physa heterostropha Say. On all the lists. Quite uncommon here.

" *ampullacea* Gould.? (Dawson.)

" *ancillaria* Say. Lake of the Woods (Dawson). Also rarely at Winnipeg.

Aplexa hypnorum L. On all lists. Usually a fine shell here.

Planorbis corpulentus Say. Lake of the Woods (Dawson).

" *trivolvis* Say. On all the lists.

" *macrostomus* Whiteaves. Lake of the Woods (Dawson).

" *bicarinatus* Say. (Bell and Dawson.)

" *campanulatus* Say. Winnipeg, also by Bell and Dawson.

" *exacutus* Say. Winnipeg, also by Christy, Dawson and Holland.

Planorbis albus Müll. (Holland and Taylor.)

" *parvus* Say. On all the lists.

" *umbilicatellus* Ckll. (*umbilicatus* J. W. Taylor.) Brandon (Christy, etc.).

Planorbis cristatus L. A pair from this place, identified by Dr. Sterki.

Planorbula armigera Say. On all the lists.

Ancylus parallelus Hald. (Christy & Dawson.)

" *rivularis* Say. (Dawson.)

NEW SOUTHERN UNIOS.

BY BERLIN H. WRIGHT.

N. Harperi, sp. nov.

Shell smooth, with slightly elevated growth lines, black towards the umbos and tinged with red towards the base. Shining above, rayless, oblique or very inequilateral. Umbos elevated and nicely rounded; substance of the shell moderately thick, thinner posteriorly; bluntly pointed behind with an inclination to biangulation. Dorsum slightly arched, ligament red, basal margin slightly curved; umbonal ridge rounded above and decidedly flattened out at the posterior extremity; teeth double in the left and single in the right valve, cardinals pointed, compressed and oblique, with a supplemental tooth or pointed callosity in the right valve midway between the cardinal and

lateral teeth and an accompanying depression in the opposing valve; laterals straight with an elevated collar or ridge as an extension of the lower lateral tooth and extending up to the cardinal; cicatrices confluent, cavity of the beaks very slight, nacre pale white in old and flesh-colored in young.

Diameter .75, length 1.25, width 2 inches.

Habitats—Altamaha, Suwannee and Flint Rivers.

Type in National Museum.

Remarks: Two adults were first received from the Altamaha River, Liberty County, Ga. Later three others came from the Suwannee River, Madison County, Fla., and still later twenty others from Spring Creek, a branch of the Flint River, in Decatur County, Ga.—showing quite a range, and yet in all of these places it seems to be a rare shell, as so few were received in large lots of several hundred. The teeth are quite large and solid for the size of the shell. It is difficult to place it with any group, for which reason comparisons would seem out of place. The younger specimens bear some resemblance to simulans or nux, but it is less inflated in the umbonal region, and more compressed or flattened and pointed behind than either of them, and is also more oblique or inequilateral. It has heavier and blunter umbos and beaks than *N. perovatus* Con., and also a straighter base and less pointed behind.

We dedicate this species to Prof. George W. Harper, Principal of the Woodward High School, of Cincinnati, O.

U. Tinkeri, sp. nov.

Shell black above, shading off to a lighter color posteriorly and around the base, covered with close elevated growth lines; nearly circular, somewhat inflated; rayless, except in the very young, which are covered with fine green rays; bluntly pointed behind, gracefully and continuously curved in front up to the dorsal margin; dorsum arched; base abruptly extended near its center by reason of the broad, rounded ridge which extends from umbo to base; cardinal teeth solid, direct and double in both valves; lateral teeth double in the left and single in the right valve, heavy, somewhat curved, very deeply indented and coarsely serrated; beak cavity considerable and very angular, anterior cicatrices separated by a mere thread, posterior cicatrices confluent; nacre white or slightly flesh-colored.

Diam. 1, length 1.50, width 1.75 inches.

Habitat: Tombigbee River, Alabama.

Type in National Museum.

Remarks: This is another of those shells that is not strongly distinct from other known forms and yet sufficiently removed from any to make a name necessary. It seems to lie between *U. castaneus* Lea and *U. unicolor* Lea—from the former it differs in being more circular, thinner, not tumid, not so oblique, darker colored, shorter laterals, less capacious, beaks blunter and undulations fewer and coarser. From unicolor it differs in being thicker, rougher, more inflated, narrower, pallial margin and white nacre. Some forms of it approach *U. leibi* Lea, but are less inclined to a quadrate outline and blacker, and the young are beautifully rayed.

We name this species for Prof. B. W. Tinker, Superintendent of Schools of Waterbury, Conn., who has a fine collection and takes special interest in this branch of natural science.

(*To be continued.*)

CREPIDULA CONVEXA SAY, VAR. GLAUCA SAY, SAN FRANCISCO BAY.

As will be seen by the following from a recent letter received from Mr. Hemphill, he has made another interesting discovery:

"I had a couple of hours a few days ago on the old oyster-beds at Alameda again, and have added *Crepidula glauca* Say to the introduced shells from the east. I send you samples of the dark and light varieties. The largest ones I send are as large as any among the 30 or 40 specimens I found."

The largest measured 12½ mm. by not quite 9 mm. and are quite characteristic. It remains to be seen whether this species will attain as large size in this new environment as in its native haunts. The last (February) NAUTILUS, it will be remembered, contained a brief note, announcing the detection of *Fusus* (*Urosalpinx*) *cinereus*, in this same locality, on the *eastern* shore of the bay, a dozen miles or so distant from where *U. cinereus* was first discovered. This is Mr. Hemphill's *third* find of eastern forms in San Francisco Bay.

The specimens above noted are in the U. S. National Museum No. 158501.

ROBERT E. C. STEARNS.

Los Angeles, Cal., March 10, 1899.

ON THE OCCURRENCE OF ARION FASCIATUS, NILS. IN AMERICA.

BY WALTER E. COLLINGE, F. Z. S.,
Mason University College, Birmingham, England.

Whilst in Washington, D. C., a friend of mine collected for me a few slugs from a garden, amongst which I was surprised to find a single specimen of *Arion fasciatus* Nils. The specimen measured (in alcohol) 26 mill., and is of a brown color with darker lateral bands which are continued to the anterior border of the mantle; the foot-sole is almost white and there is a faint keel; it approaches very closely the var. *neustriacus* Mabille. Adult keeled forms of this variety are very uncommon in the British Isles, and from this fact I assumed that this individual had probably been introduced from Europe. My friend has since ascertained that such is very likely the case, as he has learned that a previous owner of the garden was in the habit of importing plants which were usually packed in moss.

A. fasciatus is easily distinguished from *A. hortensis* Fér., by its white foot-sole, and from the majority of the species of this genus by the peculiar form of the receptaculum seminis, which instead of being pyriform or oval in shape, is elongated, terminating in a long pointed apex.

PISIDIA NEW TO OUR COUNTRY, AND NEW SPECIES.

BY DR. V. STERKI.

It has been considered almost an axiom that the American Pisidia lie eo ipso distinct from those of the eastern continent. But last year, the efforts of several conchologists have brought to light a number of species which are identical with European forms.

1. In Lake Ontario, on the New York shore, by Mr. Frank C. Baker; in the Hamilton Bay, Ontario, by Mr. James Johnston, a Pisidium has been collected which is absolutely identical with a form from England received as *amnicum* Müll., and, as it seems, not distinct from one of France, under the same name. Mr. Clessin, to whom a few specimens were submitted, thinks it not exactly amnicum. Considering the great variability of most Pisidia, these forms must be studied further.

2. *Pis. henslowianum* Shep. has also been collected in Hamilton Bay, Lake Ontario, by Mr. James Johnston; a number of good specimens.

3. *Pis. milium* Held, conforming with European specimens, have been collected in Straits Lake, Michigan, by Mr. Bryant Walker, and in Dallas Lake, Stearns County, Minn., by Mr. H. E. Sargent. Among a number of fossils from a marl bed in Tuscala County, Mich., also collected by Mr. Walker, there was one valve of the same species.

4. In Aroostook County, Maine, Olof O. Nylander has found a few specimens of a Pisidium identical with one from England named *milium* Held, which, however, Mr. Clessin says, is not that species. It is of somewhat the same shape and color, but larger and the beaks are more prominent.

The question whether these Pisidia be native or introduced is answered, at least for *milium*, by the fossil found. As to No. 4, an importation is rather improbable, from its habitat. For Nos. 1 and 2 the possibility of a colonization cannot be denied, just as *Bithynia tentaculata* has immigrated from Europe, and, on the other hand, *Calyculina transversa* Say seems to have been transported into England. Further researches are very desirable, and also fossils should be secured wherever such may be obtainable.

5. *Pis. contortum* Pr. This Pisidium has been described, in 1852, as a fossil sp. from Massachusetts, and has lately been collected from marl beds in Maine by Mr. Nylander, and in Michigan, by Mr. Walker. Last year Mr. Nylander succeeded in finding a few recent, living specimens, in Aroostook Co., Me. The shell is transparent, of a deep wine or amber color, the surface highly polished.

6. *Pis. medianum*, n. sp. Mussel of rather small size, elliptical in outline, much inflated, often of somewhat irregular growth; superior and inferior margins moderately curved, posterior well rounded, or with a slight angle above, anterior rounded or slightly truncated obliquely; beaks rather in the middle, slightly directed toward the posterior, rather high, prominent over the hinge margin; scutum and scutellum very slightly marked; surface with very fine, crowded striæ, somewhat shining, light horn to yellowish or straw colored; shell thin, nacre colorless, muscle insertions barely perceptible; hinge fine, plate narrow; cardinal teeth lamellar, slightly curved, the right one in its posterior part somewhat thicker, simple or with a fine, longitudinal groove; lateral teeth pointed, the outer ones of the right valve comparatively large; ligament fine, long. 2.5 to 3.5, alt. 2.0 to 2.8, diam. 1.7 to 2.3 mill.

Habitat: Michigan, all over the state; lakes in Wisconsin.

Var. minutum, n. Smaller, less elongated, of more regular shape, almost globular when fully grown, usually of deeper color, surface with very fine striation, polished, but almost always covered with a greenish or blackish coating. Aroostook County, Me., very common in some waters, collected by Mr. Olof O. Nylander; Mohawk, N. Y., in the collection of the late Dr. James Lewis; also some forms from Michigan rather range with the variety, *e. g.*, from Hess lake, collected by Mr. L. H. Streng. This *Pisidium* has been known for years. But owing to the fact that *Pis. rotundatum* Pr., of almost the same size, was not exactly known, it was thought better to defer publication. It is one of the best characterized of our species, not nearly related to or resembling any other Pisidium, except *P. ferrugineum* Pr.,[1] which is at once distinguished by the strong ridges on the beaks. *Pis. medianum* is mainly characterized by its beaks being almost exactly in the middle of the mussel, its anterior part being sometimes even smaller than the posterior. Hence its name.

Specimens have been collected in deeper water, 24 meters, of Lake Michigan, off New York point, and also from the stomachs of whitefish, sent by Mr. Bryant Walker. Among a lot from Blue Lake, Michigan, collected by Dr. R. J. Kirkland, there were many specimens with that peculiar, perpendicular scar so often seen in Pisidia and Sphaeria, but unusually deep.

7. *Pis. kirklandi*, n. sp. Mussel of medium size, somewhat oblique, well inflated when mature, very little so in the young, high, rather oval in outline; superior margin strongly, inferior moderately curved, posterior slightly truncated, passing into the superior by an obtuse, rounded angle, antero-superior slightly curved or almost straight, sloping toward the rounded anterior end; scutum well, scutellum slightly marked; beaks somewhat posterior, high and prominent in the mature, low in the young mussel, with stout ridges, highest at the posterior and slanting towards the anterior ends, slightly sinuous on the outer sides; surface with very coarse, rather regular striation, dull, rugulose, straw colored in the young, light grayish in the adult with a light zone along the margin; shell rather thick, nacre almost glossy, appearing bluish in old specimens, muscle insertions distinct; hinge stout, hinge plate broad; cardinal teeth of moderate size, rather high up on the plate, the right one angular, its posterior part thick-

[1] That species has, so far, been seen only from New England and New York.

ened, with or without a groove; below it is a deep excavation; left cardinal teeth: the anterior rather stout but its edge acute, the posterior oblique, slightly curved; lateral teeth stout, the outer ones of the right valve quite small; ligament strong.

Long. 4, alt. 3.8, diam. 2.7 mill.

Habitat: Michigan, Illinois, Ohio.

In a lot from the Grand River, at Grand Rapids, Mich., collected by Dr. Reynold J. Kirkland, in whose honor the species is named, there were over two hundred specimens, most of them young and half grown, in company with *Pis. compressum* Pr. (thousands of different forms), *fallax*, *cruciatum*, *punctatum*, and a number of other species. A few from Berry Lake, Chicago, were sent by the Chicago Academy of Science (Mr. F. C. Baker), and one single valve was found in the Anglaize River, tributary to the Maumee River, Lake Erie drainage, by the writer, in 1893, in company with *Pis. compressum* Pr.

Pis. kirklandi is related to *P. compressum* Pr., and more so to *fallax* St. From the former, it is at once distinguished by the more rounded outlines of the adult specimens; the young are higher in the anterior part, and the mussel is nearly square, while the young of *compressum* are more triangular; and in the latter, the beaks are higher, the (young) mussel is of comparatively larger diameter. From *P. fallax* it differs by its larger size, the coarse striation, the shape of the ridges and the grayish color.

Pis. septentrionale Prime.[1] The name being pre-occupied for a Lapland species, *P. fallax* var. *septentrionale* St. must be changed, and *v. boreale* is herewith proposed.

New Philadelphia, Ohio, March, 1899.

GENERAL NOTES.

Cochlicopa lubrica in Alaska. In the article describing *Hyalina pellucida* and *H. arctica*, Science Record, II, p. 172, 1884, Mr. Lehnert records finding a specimen of the above species in the same dried-plant packing material the *Hyalinæ* were found in, from Point Barrow, Alaska.

West Coast Oyster Hermaphroditic.—F. L. Washburn, of the University of Oregon, has lately confirmed Prof. Schiedt's discovery that male and female elements co-exist in the West American oyster. There seems to be no evidence of protandry, mature eggs and spermatozoa existing at the same time. The full account is in *Science* for March 31.

[1] Cat. Corbiculadæ, 1895, p. 61, "Undescribed."

The Nautilus.

Vol. XIII. JUNE, 1899. No. 2.

COLLECTING IN ARIZONA AND NEW MEXICO.

BY REV. E. H. ASHMUN.

When I began searching this region for land shells, about four years ago, I had done no land collecting, and for that matter but very little in any line, and there have been many surprises. It is a very dry region and I did not expect to find much, and, indeed, molluscan life is scarce, but it has proven of sufficient interest to make up in quality what it lacks in quantity. This is due to the fact that these territories were little known to the conchologist, and to the existence of many mountain ranges, separated by vast stretches of semi-arid plains, isolating them, as far as their molluscan life is concerned, and thereby increasing the probability of the presence of new forms in the different mountain areas.

My collecting has had to be done "on the side," in connection with a regular vocation, as time could be snatched for it. But the regular work has taken me over a considerable part of both territories, and so afforded an opportunity of collecting in a number of different localities, though seldom giving time for a sufficiently thorough search of any of them.

With but few exceptions, no land shells are found except in the high altitudes of the mountains, these localities only supplying sufficient moisture and vegetation, and the collector must be prepared for long tramps and much climbing and hard lifting as well, in overturning rocks and logs to reveal the hiding place of these tiny creatures.

I have found shells at 10,000 feet alt., and other collectors still higher. I once walked fifteen miles in one day, and upset rocks and logs enough, I should think, to materially change the appearance of the entire locality, and had to take a train at 10 p. m. and ride till 3 o'clock. After a day of this tramping, climbing and lifting, without finding much, I have asked myself, Does this pay? but have been just as eager to improve the next opportunity, no matter how much hard work it involved.

Sometimes the most promising locality has yielded nothing of special interest, while a less likely field has produced new species. Especially has this been the case in places that at first seemed too dry to be worth investigating, but which have later been found to contain minute forms, especially Pupidæ. This fact, taken in connection with their minuteness, accounts mainly for the new Bifidariæ being mostly recent finds.

A horseback ride of twenty miles from Crittenden, Arizona, with a companion, brought us into the Santa Rita Mountains, where we camped one night with no roof but the blue canopy. A half day's collecting in what seemed a very promising cañon resulted in only about forty specimens all told; but when I found the lot to contain *Bifidaria pilsbryana*, further west than before known, and the first examples of *Bifid. ashmuni* Sterki, my disappointment was perceptibly mollified.

One Monday morning I walked four miles up the very dry Ephraim cañon, having to be back in just four hours from the time of starting. I covered the eight miles, had two hours for collecting, and was back on schedule time with but few shells, but they included *Bifidaria perversa* Sterki, and *Bifid dalliana* Sterki, both n. sp., and *Bifid. ashmuni* form *minor*. The representatives of this genus are so minute that they easily elude one's search, especially in dark cañons and beneath thick undergrowth; and I have found it of advantage, particularly when my time was limited, to gather the dirt and leaves found to contain them and carry it away. I usually have a flour sack in my pocket for the purpose. About a peck of such dirt taken home from Jerome, Arizona, nearly 500 miles, "panned out" 93 *Bifid. hordeacella* var. *parvidens* Sterki, n. var., and about 40 *Thysanophora horni* Gabb, but it took many hours to look it over. At the present writing, I have dirt from five different localities, ranging from 100 to 850 miles from home, perhaps two bushels in all, waiting to be

examined. The greater part of it is river drift. I have just now shipped it 500 miles to my new home.

My experience has given emphasis to the importance, readily appreciated in marine collecting, of securing many examples of what one finds, though time has not always permitted it. The Hoosier woman who advised her husband to "git a plenty while yer gittin," was wise in her day and generation.

In 1895, I found a quantity of *Physa virgata traski* Lea, in Salt River, at Tempe, Arizona, large and fine, and a goodly number were taken. The same locality has been revisited a half dozen times since, but not until April, 1899, have I again seen as large ones. *Cirnega* is the Spanish word applied to a marshy place from which water flows—at once a marsh and a spring. In one of these, near Crittenden, Arizona, in the summer of 1897, I found *Physa mexicana conoidea*, and under logs, *Bifidaria pentodon;* but it was late in the afternoon when I reached the place, and I could secure but few of either. I had supposed it a perpetual spring, but returning last fall, I found it as dry as a floor.

Not a little of my collecting has been done in snatches of time when it seemed almost an accident that anything was discovered. As the train on the Santa Fé Pacific R. R. stopped one morning at Navajo Springs, Ariz., I rushed down to the bed of the (then dry) Rio Puerco of the West (Arizona rivers sometimes run bottom-side up), to see if I could pick up something from the drift, not expecting the train to stop more than five minutes at the most. But fortunately a freight accident ahead delayed our train two hours, and I gathered twenty-one species. The other passengers were grumbling over a late breakfast, but a trifle like a belated meal does not disturb a "shell crank" when there is any collecting on hand.

On the 13th of last January I was taking the 90-mile stage drive to White Oaks, N. M.; as the stage stopped to change teams at 9 a. m., I walked on ahead with no thought of any collecting at that time of the year, but passing an artificial pond I concluded to take a look at it. By breaking the ice I secured five examples of Physa mexicana, Phil. My hands were cut on the ice and chilled by the wind. I had nothing to put my shells in, and carried them in my hand for an hour till I found an empty cartridge and could deposit my shells within a shell. At 3 p. m., when the next change was made, I again walked on; and under some rocks, where the snow had

melted, I found three Bifid. hordeacella, which I deposited in my spectacle case for want of a better receptacle. I expected the stage every minute, but the Mexican driver was accommodatingly slow, (his *poco tiempo* is usually *mucho tiempo*), and I had time to gather up a little dirt into my silk muffler, which contained 13 more specimens.

This is a mild climate, but not so much as to make an all night stage ride in the mountains in mid-winter, in an open rig, an unmixed luxury. We have the same brand of snow and ice that they manufacture up in Minnesota. If the reader will take down his picture of a six-horse Concord stage with a Jehu driver and replace it with one containing a buckboard and a pair of half-starved bronchos or lazy mules and a Mexican driver, who *sabes* little English and less horsemanship, he will see the real and raw article as it is served up to us on this 22-hour ride. But a plentiful supply of wraps, including several thicknesses of paper under my vest and a heavy blanket enveloping my head and shoulders, a burning lantern between my feet and an occasional walk or run of a mile or so, served to keep me above freezing point.

Returning by a different route I halted the stage in a cañon of the Ascuras Mountains long enough to gather up into a gunny sack nearly a bushel of drift lodged by the road side, in which over 1,200 shells were found.

The localities visited have not been thoroughly examined, and many mountain ranges await the first visit of the collector. There is no reason to doubt that further search will yield excellent returns.

The following new species and varieties have rewarded my efforts:

Bifidaria perversa Sterki.
Bifidaria quadridentata Sterki.
Bifidaria ashmuni Sterki.
Bifidaria ashmuni Sterki form minor.
Bifidaria hordeacella Pils. var. *parvidens* Sterki.
Bifidaria dalliana Sterki.
Pupilla sonorana Sterki.
Pupilla sonorana var. *tenella* Sterki.
Ashmunella rhyssa Dall.
Ashmunella mirorhyssa Dall.
Ashmunella ashmuni Dall.
Ashmunella pseudodonta Dall.

Ashmunella pseudondonta subsp. *capitanensis* Ashmun & Cockerell.
Agriolimax ashmuni Pils. & Van.
Pyramidula Cockerelli Pilsbry.

DESCRIPTIONS OF NEW LAND SHELLS FROM SOUTH AMERICA.

BY C. F. ANCEY, DRA-EL-MIZAN, ALGERIA.

Conulus Coroicanus, Anc.

Testa turbinata, globosa, tenuis, pellucida, nitidissima, virenticornea, obtecte et minute perforata. Spira abrupte conica, elata, apice parvo, vix obtusiusculo. Anfractus $6\frac{1}{4}$–$6\frac{1}{2}$ convexi, lente crescentes, sutura lineari subappressa discreti, lineolis incrementi lævibus, ultimus altus, tumidus, initio obtuse angulatus, angulo prope aperturam evanido, basi convexus. Apertura subobliqua, rotundato-lunata, ampla. Peristoma simplex, rectum, ad columellam minute supra perforationem in trianguli forma dilatatum, marginibus remotis. Diam. 6–$6\frac{1}{2}$, alt. $5\frac{1}{5}$–$5\frac{3}{4}$ mill.

Andes of Bolivia, east of Lake Titicaca, province of La Paz.

A very fine translucent species, remarkable on account of its large size, conic spire and tumid last whorl. It is provisionally referred to *Conulus*, until the soft parts are examined.

Stephanoda Iheringi, Anc.

Testa orbicularis, depressa, aperte lateque umbilicata, umbilicus circularis, tertio diametri vix minor, anfractus omnes prœbens, albescens (subfossilis), tenuissime confertimque striata, striis parum obliquis, in ultimo subflexuosis. Spira convexa, obtusissima, parum elevata. Anfractus $4\frac{1}{3}$, lente accrescentes, convexi, sutura impressa; ultimus rotundatus, cylindricus, haud deflexus, proecedente vix amplior. Apertura lunata, cœterùm regulariter extus basique rotundata. Peristoma simplex, haud expansum. Diam. $1\frac{1}{2}$, alt. $\frac{2}{3}$, alt. apert. vix $\frac{1}{2}$ mill.

Rio Grande do Sul, Brazil.

An insignificant minute shell, but not referable to any other of the group.

Stephanoda Latastei, Anc.

Testa orbiculata, depressa, haud nitens, late umbilicata, umbilicus magnus, tertio diametri paulo latior, angulo obtuso cinctus, sordide fulvida, castaneo flammulata, epidermide fusco. Spira anfractu penultimo vix prominente, medio distincte concava. Anfractus $5\frac{1}{4}$ lente crescentes, sutura profunda, embryonales oculo nudo lœves, sequentes lamelloso-costulati et lineis tenuissimis spiralibus sub valida lente impressi, intervallis microscopice striatulis; sculptura in anfractu

ultimo validiore, costulis flexuosis; ultimus longe et paulatim deflexus, altus, subcylindricus, pone suturam tumidulus. Apertura subobliqua, extus sinuosa, oblongo-lunata, basi obscure subangulata. Peristoma simplex, marginibus remotis. Diam. maj. 7; min. $6\frac{1}{4}$; alt. fere 4 mill.

"Cordillere de Chillan," Chili (F. Lataste). Belongs to the typical group, which includes *S. dissimilis* d'Orb., *S. Binneyana* Pfr., *Gratioleti* Hupé, and probably allied to the latter, but surely quite distinct.

Epiphragmophora andivaga, Anc.

Testa depressa, attamen convexa, obtecte umbilicata, subsolida, nitidiuscula, corneola, fascia mediana in ultimo anfractu, utrinque late pallido-marginata, duabusque pallide fuscis in parte supera ejusdem anfractus in penultimo continuis, in ultimo versus aperturam plus minusve coalescentibus decorata, basi fuscula, centro pallidior, epidermide tenui pallide luteo-virescente induta, lineis obliquis incrementi striatula, superne striis spiralibus tenuiter incisa. Spira convexa, late subconoidea, obtusa. Anfractus $4\frac{1}{2}$ regulariter sed satis rapide crescentes, convexiusculi, sutura impressa; ultimus suprà convexodeclivis, initio obscure subangulatus, antice leviter deflexus, basi post aperturam constrictus. Apertura elliptica, sublunata, valde obliqua, fasciis transmeantibus. Peristoma album, crassiusculum, reflexum, supra umbilicum mediocrem fere penitus evolutum, marginibus remotis, callo tenui junctis. Diam. $19\frac{1}{4}$, min. $15\frac{1}{2}$, alt. 10 mill.

Andes of Peru, along with *E. claromphalos* Deville et Hupé, *Bulimulus revinctus* Hupé, *B. stenacme* Pfr., *B. Moniezi* Dautz. and others.

This is a small species, not referable to *E. alsophila* Phil., *Tschudiana* Phil., *clausomphalos* Dev. & Hupé, to which it seems to be allied. It is shaped like *E. rufocincta* Newcomb, from Catalina Island, California.

Epiphragmophora Turtoni, Anc.

Teste globoso-subdepressa, imperforata vel umbilico prorsus clauso munita, solidula, sub epidermide tenui ac pallido stramineo-lutescente albida, striatula et (primis anfractibus exceptis) undique confertim et minute malleata, suboleoso-micans, fascia mediana castanea suturam anfractuum 2 inferiorum sequente cingulata. Spira elevato-subglobosa. Anfractus 5 convexi, primi lævigati, sequentes obliqne striatuli; ultimus amplus, rotundatus, antice longe valdeque deflexus, subtus breviter depressus, radiatim striatulus, basi pone aperturam constrictus. Apertura obliqua, transverse oblonga, ferri equini fere exacte formam simulans, vix lunata. Peristoma album, labiatum, undique crasse valdeque rotundato-revolutum, intus prope columellam tuberculo indistincto prœditum, marginibus callose appressis, valde convergentibus, callo tenui junctis, basali in umbilici loco albo-dilatato. Diam. maj. 29, min. $24\frac{1}{2}$, alt. 18 mill.

Habitat: unknown, but most probably Bolivian.

This fine species is quite distinct from others. The nearest ally is *E. estella* d' Orb., from which it differs in being more globose, imperforate, in having the peristome more developed with the margins approximate, and many other particulars. It cannot be confounded with *E. Tucumanensis* Doering, and *E. Saltana* Anc., from northern Argentina, in which the sculpture is not the same at all and from which the above characters may separate it at a glance.

NATURAL HISTORY OF THE TRES MARIAS ISLANDS, MEXICO.

The above is the title of "North American Fauna, No. 14," recently published by the U. S. Dept. Agriculture (Division of Biological Survey). The title should be modified by placing the words "Contributions to the," before the word "Natural," as no mention is made of the *Insecta*, and *only six species of mollusks* are given. These are all land shells, and determined by Dr. Dall as follows: *Polygyra ventrosula* Pfr., *Orthalicus undatus* Brug., *Orthalicus undatus melanocheilus* Val.,[1] *Lamellaxis* ——? *Opeas subula* Pfr., and *Glandina turris* Pfr. The two forms of *Orthalicus* were heretofore known to occur in the islands; the others are additions to the list published by the National Museum in 1894. The author of this number of the N. A. Fauna, Mr. E. W. Nelson, in mentioning the names of Col. A. J. Grayson and Alphonse Forrer, says, "no other naturalist is known to have visited the islands until the spring of 1897," when in April of that year Mr. Goldman and himself crossed over by sail-boat from San Blas, remaining on the islands from the 2d to 31st of May. The summary of *animal* species collected including the six mollusks above named sums up 121. The author should have known that the islands were visited in the spring of 1876 by Mr. W. J. Fisher, who made a large collection of molluscan forms as published in the Proc. U. S. National Museum, pp. 139–204, of Vol. XVII, 1894, where 89 species were listed. Four of the land-

[1] The *Orthalicus* of northwestern Mexico is not *undatus*, which is an exclusively Antillean and Floridian form. It is *O. princeps* Brod,, a more boldly marked form than *undatus*, with distinct and coarser spiral striation, and various differences in the soft anatomy, which has been worked up by Strebel, and confirmed by my own preparations. Probably *melanocheilus* holds the same relation to *princeps* that *floridensis* does to *undatus;* but this has not been proven as yet.—Ed.

shells collected by Mr. Nelson, not previously detected, added to those before credited to the islands, makes a total of 93, or *three-sevenths* of the *animal* forms constituting the *Fauna* of the group, thus far reported.

It is not unlikely that insect species were collected by Grayson and Forrer and have been described and perhaps published somewhere. Only the mollusks collected by Mr. Fisher came under my notice. ROBT. E. C. STEARNS.

Los Angeles, Cal., May 11, 1899.

NEW AMNICOLIDAE FROM FLORIDA.

BY H. A. PILSBRY.

During the past decade a number of undescribed species of this family have accumulated in our collections, chiefly gathered by Mr. C. W. Johnson, Prof. C. E. Beecher and the author.

Amnicola sanctijohannis n. sp.

Shell slightly rimate, ovate-turbinate, corneous, somewhat translucent, rather thin. Surface glossy, the growth-lines hardly visible. Spire rather high, conic, the apex rather obtuse. Whorls $4\frac{1}{2}$, rather convex, separated by a moderately impressed suture which is margined below by a conspicuous transparent border (not visible, of course, in opaque dead or incrusted shells.) Aperture ovate, angular above, a little flattened on the parietal side; peristome a trifle expanded and blackish in fully adult shells, acute, continuous, the parietal wall adnate but with distinct edge, often somewhat calloused within. Alt. 3.4, diam. 2.4 mm.; greatest axis of aperture 1.7 mm.; another specimen measures 3.2, 2.5, 1.7 mm. St. John's river, Florida, at Astor, Lake Co., (type locality), and Silver Spring Run, Marion Co., (Pilsbry & Johnson); Wekiva river (C. E. Beecher.)

This is a larger species than *A. floridana* Ffld., and differs in being imperforate, translucent waxen-whitish when taken alive, and in showing a distinct sub-sutural margin like "*Hydrobia*" *monroensis*. The aperture is distinctly angular above, not rounded as in adult *A. floridana*.

The type series was collected by C. W. Johnson and H. A. Pilsbry, in 1894. Mr. Beecher's specimens from Wekiva river are thinner and bear a delicate ferrous incrustation.

Amnicola Johnsoni, n. sp.

Shell umbilicate, globose, rather thin, pale brown, somewhat transparent. Surface nearly smooth, showing faint growth-striæ. Spire short, obtuse. Whorls $3\frac{1}{2}$, the first convex, planorboid above, the rest very convex, somewhat flattened and strongly "shouldered" below the sutures. Convex at periphery and around the circular umbilicus. Aperture large, oblique, oval, somewhat angular above; peristome thin, the outer and basal margins unexpanded, columellar margin expanded above, not continuous across the parietal wall, which is merely varnished by a light deposit, and is about half the length of the free columellar lip. Alt. 2.7, diam. 2.56, longest axis of aperture 1.7 mm. Operculum Amnicoloid.

St. Augustine, Florida (C. W. Johnson).

The conspicuously obtuse apex and globose contour are unlike any other Floridian species, and somewhat similar to the much larger, more solid and opaque northern *porata* form of *Amnicola limosa* (Say). It is named after Mr. Charles W. Johnson, who collected the series of some forty specimens in the collection of the Academy.

Lyogyrus Dalli Pils. & Beech. is similar to the present species in contour, but is smaller, paler, and differs generically in the closely coiled operculum. *L. granum* (Say) has a decidedly more conical and produced spire, rounder whorls, and, of course, differs in the operculum.

Paludestrina monas, n. sp.

Shell turbinate-conic, rimate-perforate, thin, pale brownish horn-colored; smooth. Whorls 4, very convex, especially below the deeply impressed suture, the apex obtuse. Aperture vertical, oval, slightly narrowed at the upper extremity, the inner margin slightly less orcuate than the outer; peristome thin, the outer margin gently expanded, a little sinuous, being produced forward below. Alt. 1.8, diam. 1.3 mm.

Wekiva river, Florida, with *Lyogyrus Dalli* and *Amnicola sanctijohannis* (C. E. Beecher, February, 1886).

In contour this species resembles *Bythinella Aldrichi* on a small scale. The sinuation of the outer lip is somewhat like that of *Pleurocera*, though much less pronounced. Something similar is found in *B. Hemphilli*.

The following species of this family are now known to us from Florida:

Paludestrina (formerly *Bythinella*) *aequicostata* (Pilsbry).
" " " *Nicklíniana* var. *attenuata* (Hald.).
" " " *brevissima* (Pilsbry).
" *monas* Pils.
Littoridina (?) *monroensis* (Ffld.). Described as *Hydrobia.*
Amnicola sanctijohannis Pils.
" *floridana* Ffld.
" *johnsoni* Pils.
Lyogyrus Dalli P. & B.
Gillia (?) *wetherbyi* (Dall). Described as *Hydrobia.*

We will be glad to hear of any other species from the State. The above-named forms are all from the St. Johns and Wekiva rivers and St. Augustine, and their occurrence elsewhere will be of interest to learn. Probably additional species will reward search in other streams.

They may be collected with a fine-meshed wire scoop, or by gathering a mass of aqnatic vegetation, drying it in the air, and then shaking over a paper. This method has been very successfully practiced by Mr. C. E. Beecher in the Wekiva river.

In some places *Amnicolidæ* are incredibly numerous in lake beds. The floor of Lake George, on the St. Johns, is covered in some parts with mud charged with *Paludestrina æquicostata,* and the same species has been found on the bottom of Lake Okeechobee.

NEW SOUTHERN UNIOS.

BY BERLIN H. WRIGHT.

U. rotulatus, sp. nov.

Shell black, smooth anteriorly and over the umbos and with elevated growth-lines over the remainder of the surface, circular, inflated, rayless; umbonal ridge wanting, but replaced by two slightly raised, diverging curved folds; beaks retuse, blunt and broad; substance of the shell rather thick and uniform; beak cavity very deep, wide, sharply angular and with no visible cicatrices; anterior cicatrices distinct, remarkably deep and rough; posterior cicatrices confluent, smooth and slightly impressed; cardinal teeth low, very much notched, inclined to be double in the left and single in the right valve; lateral teeth long, slightly curved, not prominent, and gradu-

ally disappearing in the dorsal region, where a broad smooth plate separates them from the cardinal teeth; nacre dead white, except for a small area in the posterior part which is silvery, iridescent.

Diameter 1.25, length 2, width 1.8 inches.

Habitat—Escambia River, Escambia County, Florida.

Type in National Museum.

Remarks: This species is clearly a member of the *circulus* group, and its southernmost member. Compared with *N. circulus* Lea, it is more uniformly inflated, black, longer laterals, teeth all less prominent, deeper beak cavity and the superior forward cicatrices are deeper and shorter. It is to be regretted that thus far the type specimen is the only one in hand, and that does not show the beaks, which are much eroded. It is, however, so radically distinct that we do not feel any hesitancy in according it specific rank.

CORRECTION: In description of *U. Harperi* Wr., in NAUTILUS for May, p. 6, "N," first line, should be "U."

(*To be continued.*)

AGASSIZ ASSOCIATION DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association, by its General Secretary, Dr. W. S. Strode.]

COLLECTING IN SOUTHERN CALIFORNIA.

[Extract from the report of Mrs. E. H. King. From the Transactions of the Isaac Lea Conchological Chapter for 1898.]

I spent the winter and spring of 1898 in Southern California, and visited the seaside a number of times. Redardo, Santa Monico, San Pedro, Terminal Island and Dead Man's Island. I collected a great quantity of fossils (about 20 species) on Dead Man's Island, among them a beautiful *Fusus* which I prize very highly. At the base of the Island in shallow pools I found a number of living *Nassa mendica*. The tide came in while we were on the Island and we were compelled to return on the sea wall, which is built of huge blocks of granite piled promiscuously. We scrambled over these and often had to jump from one to another, the burning hot sun blistering our faces, but we held on to our shells and finally reached the shore. We were told the sea-wall was a mile and a quarter long.

At Redondo I secured the largest shell of *Pachydesma crassatelloides* that I have ever seen. Terminal Island afforded more shells than any other place I visited. On muddy banks of little pools near the lagoon I found a quantity of *Cerithidea sacrata* and *Melampus olivaceus*. I had read that these were found on "mud flats of brackish pools," and a short search revealed abundance of them, also a few specimens of *Bulla nebulosa*. On the ocean side of the Island I found a good *Ocinebra Poulsonii*, a *Trophon Belcheri* and the rare *Waldheimia*. A few good shells of the following: *Psammobia rubriata*, *Lutricola alba*, *Neverita reclusianus*, *Lunatia Lewisii*, *Drillia penicillata*, *Monoceros engonatum*, *Amiantus callosa*, *Macoma secta*, *Chione succinta*, *Tapes staminea*, *Mytilus*, *Crucibulum spinosum*, and three varieties of Acmaea, a quantity of *Chlorostoma gallina* and *Pecten equisulcatus*, upon which were numerous *Crepidula*. The beach is strewn with dead shells, among them large specimens of *Glycimeris* and *Macoma*.

GENERAL NOTES.

Philomycus lactiformis (Blainville). This slug, described by Blainville in 1817 (Journ. de Phys., p. 443) as *Limacella lactiformis*, has been only known since that time by the original specimen, which is in the British Museum. Specimens from York Co., Pa., collected by Mr. Witmer Stone in 1889, prove to agree excellently with the Blainvillean animal, having just the same white color and semi-pellucid appearance. It is not likely that the species is separable from the ordinary forms attributed to *P. carolinensis*, except as a color variation.—H. A. P. & T. D. A. C.

J. F. Babor, of Prague, has added to our slight knowledge of the Arionine group *Ariunculus*, in describing the anatomy of *A. austriacus* n. sp., from Schneeberg, near Vienna, in the Austrian Alps. (Proc. Mal. Soc. Lond., III.)

M. Ph. Dautzenberg has recently described a collection made by M. J. L. Weyers, of Sumatran mollusks. New forms of *Cerithidea* and *Stenothyra* are described, and valuable notes and figures of Melanians and Navacellæ are given. M. Weyers found the Antillean *Subulina octona* abundant in many localities (Ann. Soc. Roy. Mal. Belg. 1899).

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EPIPHRAGMOPHORA FIDELIS GRAY.

BY P. B. RANDOLPH.

This species is found in great abundance in and around Seattle. On the bicycle path that runs around the north end of town they can be seen by the score on warm spring days, and I thought a few notes on size, coloration and banding would be of interest to the readers of the Nautilus.

The first thing that attracts the attention of the collector is the variety of the coloration of the shells, ranging from dusky brown to nearly white.

In the dark forms the bands are nearly obscured; in the albino form (*E. fidelis flava* Hemp.), ours differ from the description (4th. Sup. 5th. Vol. Terrestial Air-Breathing Mollusks, Binney. p. 185) in that the bands are very faint on the upper half of the body whorl and from the periphery gradually growing darker to the umbilicus. In twelve examples before me there are no signs of bands on the other whorls. From the body whorl the color grows lighter and the embryonic whorl shows a decidedly pinkish tinge. The entire shell is covered with a thin yellow epidermis which in adult specimens is generally destroyed, leaving the upper surface a dead white.

Albinos are not uncommon, averaging about one in one hundred of the common form. This form and var. *minor*, have been found, to my knowledge, only in or near clearings, never in the deep woods or swamps.

A favorite spot for depositing their eggs is in the heavy bark of some old fir stump, a foot or more from the ground. Two years ago I collected over fifty specimens on and near the base of a big stump in a clearing.

A few pass the winter in trees twenty feet or more from the ground. Our broad-leafed maple (*Acer macrophyllum*) which grows a very rugged and massive trunk, is one of their favorite retreats, especially for the young of the late summer brood.

A theory current in this section is that the reason *E. fidelis* has departed from *E. infumata* in height of spire and coloration, is that the latter pass so much of their lives under burnt logs that the spire has become depressed and they have assumed the protective coloration so characteristic of that species.

Never having visited the haunts of *E. infumata*, I do not know how thick the timber may be or how large the burnt districts are, but I venture to say that nowhere on the Pacific Coast is the timber larger, or are there more down and burnt tracts than on Puget Sound. And still I have never seen a *fidelis* that I could not tell at a glance from *E. infumata*, and in life the animals differ so much from each other in coloration that I do not understand why the latter is not a good species instead of a mere variety.

The number of bands on the body whorl is six, though in some the bands are but faintly seen as mere lines of different shade from the adjoining bands. The width and brightness of the bands are most striking, and for convenience I have called the typical form figured in Binney's Land Shells No. 1, and the extreme form of banding No. 2.

Measuring them on the body whorl $\frac{3}{4}$ of an inch back from the extreme edge of lip, I find that No. 1 has bands of the following width and color:

Band i, $\frac{3}{16}$ in. wide, Chestnut with dark blotches.

Band ii, $\frac{1}{16}$ in. wide, Light yellowish, merging into band above.

Band iii, $\frac{1}{8}$ in. wide, Black band.

Band iv, $\frac{1}{16}$ in. wide, Light yellow, merging into No. v.

Band v, Narrow chestnut.

Band vi, Entire base of shell black, darker near the umbilicus.

Greatest diameter of shell measured $1\frac{1}{2}$ inches.

No. 2.

The greatest variation is seen in the following:

Band i, $\frac{3}{16}$ in. wide, Light chestnut with dark blotches.
Band ii, Light edge to No. i.
Band iii, $\frac{1}{8}$, Black.
Band iv, Light edge to band iii.
Band v, $\frac{3}{16}$ in. wide, Yellow, gradually merging to black of base.
Band vi, No. 6, Black to umbilicus.
Greatest diameter of shell measured $1\frac{1}{4}$ in.
In size they vary greatly. The following are the extremes.

Largest.	Smallest.
Greatest Diam. $1\frac{1}{2}$ in.	Greatest Diam. $1\frac{1}{16}$ in.
Smallest " $1\frac{1}{4}$ in.	Smallest " $\frac{7}{8}$ in.
Altitude, $\frac{7}{8}$ in.	Altitude, $\frac{9}{16}$ in.

DREDGING OFF SAN PEDRO.

BY H. N. LOWE.

Last summer, while the late Mr. Edward W. Roper was living in Long Beach, we (that is, Mr. Roper and myself) decided to do a little dredging off San Pedro. As there had been no extensive work done in that line at San Pedro in late years, we were in hopes of being rewarded with some rare shells and possibly some new species.

Mr. Roper sent for his dredging outfit which he had previously used at Eastport, Maine. We chartered the little sloop "North Star" and made three dredging trips with moderate success. We dredged in water from 5 to 20 fathoms depth, on muddy, sandy, gravelly, once on a bottom composed of dead bivalves for the most part, and two or three times among the rocks at 10 fathoms.

I made one subsequent trip with Mrs. M. Burton Williamson with the same boat and dredging outfit. We were greatly troubled in dredging by a species of red algæ, which covered the bottom so thickly in places as to choke the mouth of the dredge, thus preventing the shells from entering. For the past two years, the ocean has been full of this moss, and at times the beach has been covered with it. From this algæ in the dredge we obtained a few live specimens of *Calliostoma splendens* Cpr. and *C. gloriosum* Dall.

Besides the shells, we dredged a number of curious crustaceans and echinoderms not found on shore.

The following list includes all the species taken in the four dredging trips: all are live specimens unless marked dead:

List of Shells Dredged.

Bittium asperum Cpr., plentiful at 10 fathoms.

Cadulus fusiformis Pils. & Sharp, a few alive in sandy mud.

Calliostoma gloriosum Dall.

Calliostoma splendens (Mke.) Cpr.

Calliostoma tricolor Gabb. alive in sandy mud.

Callista subdiaphana Cpr. several young shells alive, one large dead one, one inch in diameter.

Chrysallida communis C. B. Ads.

Corbula chittyana C. B. Ads, two specimens alive at 20 fathoms soft mud. "This is exactly like West Indian specimens, and I should question its Pacific coast habitat if it were not that we have one worn valve apparently the same from Lower Cal." Dall.

Corbula luteola Cpr.

Crepidula adunca Sby., dead.

Crepidula navicelloides Nutt. var., two live ones of a very thin cup-shaped form with brown epidermis.

Cylichna attonsa Cpr.

Dentalium neohexagonum Pils., sandy mud at 10 fathoms.

Dentalium semipolitum Cpr. alive with *D. neohexagonum* Pils.

Drillia cancellata Cpr., 10 to 20 fathoms, fine gray sand.

Drillia empyrosia Dall., dead.

Drillia Hemphilli Stearns, 5 to 15 fathoms.

Drillia inermis Cpr.

Drillia pedroana Dall., dead.

Drillia pudica Hds.

Drillia quisqualis Hds., with *D. pudica* at 10 fathoms in sandy mud.

Eucosmia substriata Cpr.

Eulima micans Cpr.

Eulima rutila Cpr.

Eulima thersites Cpr., one live one at 15 fathoms.

Galerus mamillaris, on dead bivalves.

Halistylus pupoides Cpr.

Labiosa undulata Gld., dead.

Lacuna unifasciata Cpr.

Leda acuta Conr., with *L. taphria*, rare.

Leda taphria Dall., plentiful at 5 fathoms.

Leptothyra sanguinea Cpr., one dead, "unusually elevated variety or malformation." Dall.

Lyonsia californica Conr.

Macoma yoldiformis Cpr.

Mangilia anguilata Cpr., rare at 20 fathoms.

Mangilia sculpturata Dall., a few at 20 fathoms.

Mangilia variegata Cpr.

Modiola fornicata Cpr.

Myurella simplex Cpr.

Murex triadatus Sby., one fine specimen dredged from rocks at 10 fathoms, had beautiful recurved frills.

Muricidea barbarensis Gabb., one live one.

Muricidea incessa Brod.

Muricidea santa-rosæ Dall, *rare* at 10 fathoms.

Nucula exigua Ads., dead.

Nucula tenuis Ads., one live one at 20 fathoms.

Ocinebra foveolata Hds., dead.

Odostomia inflecta Cpr., one "live" example at 20 faths. soft mud.

Odostomia subplanata Cpr.

Olivella boetica Cpr., plentiful at 5 faths.

Pecten latiauritus Cpr.

Placunanomia macroschisma Desh var., two specimens found inside of an old barnacle were of a dark chocolate color on the inside, diameter $2\frac{1}{2}$ inches.

Psamobia edentula Gabb., one young shell showing color pattern.

Scala bellastriata Cpr., one live specimen.

Semele pulchra Sby.

Semele rubropicta Dall.

Cadulus (*Polyschides*) *quadrifissatus* Cpr., with Cadulus.

Solen ensis L. var. minor Conr.

Solen sicarius Gld.

Tellina Idæ Dall, one dead shell.

Tellina modestus Cpr., 5 to 10 fathoms sandy mud.

Terebratella transversa Sby.

Tornatina culcitella Gld.

Tornatina inculta Gld.

Turbonilla chocolata Cpr.

Turbonilla tenuicula Gld.
Turbonilla torquata Gld.
Turbonilla tridentata Cpr.
Turbonilla sp? a few specimens dredged at 15 fathoms were of a light brown color and extremely slender. Held at Washington for further study.
Turritella Cooperi Cpr.
Venus toreuma Gld., one dead shell.
Volvula cylindrica Cpr.

NOTES ON THE MOLLUSKS OF LILYCASH CREEK.

BY FRANK C. BAKER.

Some time ago Mr. J. H. Handwerk and Mr. W. Chadwick began a systematic survey of the little stream known as Lilycash creek, near Joliet, Ill., dividing it into sections. Section I extended from the mouth of the creek, where it emptied into the Desplaines River, to the Plainfield road, a distance of about two and one-half miles. Later, they propose to take up section II, which will include the balance of the creek. A list of the species found within that area, which Mr. Handwerk was kind enough to submit to me for identification, may be of interest, since the region has afforded several peculiar new species, and is very prolific in Sphæriidæ.

The writer is indebted to Dr. V. Sterki and Prof. H. A. Pilsbry for the identification of several of the species enumerated.

The following species were collected:

Sphærium stamineum Conrad.
Sphærium lilycasheuse Baker.
Sphærium striatinum Lamarck.
Sphærium simile Say.
Sphærium occidentale Prime.
Calyculina transversa Say.
Calyculina truncata Linsley.
Pisidium virginicum Gmelin.
Pisidium abditum Haldeman.
Pisidium compressum Prime.
Pisidium sp. Now in the hands of Dr. V. Sterki, who believes it to be a new species.
Pisidium roperi Sterki.
Limnæa humilis Say.
Limnæa desidiosa Say.
Planorbis parvus Say.
Physa heterostropha Say.
Pleurocera elevatum Say.
Amnicola limosa Say.

Pisidium walkeri Sterki.
Pisidium cruciatum Sterki.
Pisidium punctatum Sterki.
Pisidium fallax Sterki.
Pisidium splendidulum Sterki.
Pisidium variabile Prime.
Total 28 species.

Amnicola limosa var. *parva* Lea.
Cincinnatia cincinnatiensis Lea.
Pomatiopsis cincinnatiensis Anthony.
Campeloma rufum Haldeman. Reversed.

NEW SOUTHERN UNIOS.

BY BERLIN H. WRIGHT.

Unio Danielsii, sp. nov.

Shell uniformly solid, very inequilateral, subquadrate, rayless; posterior area closely, irregularly and sharply wrinkled; umbonal region traversed by several parallel, well-separated, flattened ridges or growth lines, which merge together towards the base; umbos exceedingly inflated and umbonal ridge very sharp above, gradually flattening out into biangulation towards the base; umbos broad and gracefully rounded; beaks erect but evidently not prominent; ligament dark red, not heavy; dorsal margin somewhat arched, abruptly rounded before, nearly straight on base and bluntly pointed behind; teeth heavy, well separated, the laterals long and curved, the single one having a central deep notch; cicatrices deep, smooth, the posterior ones confluent and the anterior ones distinct; beak cavity very slight; nacre creamy white with lavender border and very iridescent.

Diameter 1.25, length 1.5, width 2.25 inches.

Habitat: Spring Creek, Decatur Co., Ga.

Type in National Museum.

Remarks: Several quite distinct forms of this general type have recently come to hand, some of which have been distributed under the name of "U. incrassatus Lea. var.?" This form, however, departs so far from that of the type of the group as to fully warrant erection into specific rank. Its distinguishing feature is the remarkable degree of inflation in the posterior umbonal region, prolonged posterior and notched single lateral tooth. It is also rayless.

It gives pleasure to name this for Mr. L. E. Daniels, of La Porte, Ind., who, with others, has rendered financial aid to make these discoveries possible.

VARIATIONS OF HELIX HORTENSIS AT ROCKPORT, MASS.

BY T. D. A. COCKERELL.

I have just received from Mr. G. H. Clapp a little series of *H. hortensis* collected at Rockport, Mass. The specimens (40) include all the variations Mr. Clapp could find in a series of about 300 shells collected. Mr. Clapp says: "The bandless or very faintly banded forms were by far the most common. Typical shells were scarce, even less plenty than the transparent banded variety. On rainy days the shells were out by the hundreds."

The variations in the series are as follows:

(1.) v. *subglobosa*, Binney; shell greenish. 00000 and $00_{34}0$.

(2.) v. *arenicola*, MacGillivray; bands colorless, translucent. 12345.

(3.) v. *subalbida*, Locard; yellowish-white or very pale yellowish. 00000 and 003_{45}.

(4.) v. *lutea*, Moq.; yellow. 00000, $_{1}03_{4}5$, 1234_{55}, 0034_{5}, 12345, 123(45), (123)(45), $1_{2}345$, 10345, 00334_{5} (two), $00_{3}00$, $003_{4}0$, 12045. Some are unusually thin; most of the bandless yellow specimens are very brilliantly colored; one 12345 specimen is very small, only 16 millim. diam.

The really interesting thing about the series is that no less than three specimens show split bands, indicating apparently that this colony of *H. hortensis* is varying in the same direction as the Lexington, Va., *H. nemoralis*. The two split-band formulæ are new, to the best of my knowledge.

DR. BABOR'S REDISCOVERY OF ASPIDOPORUS.[1]

In 1833, Fitzinger described as *Aspidoporus limax* a slug from the mountains of Austria, which had the character, anomalous for a European form, of an opening in the mantle, as in the tropical African *Urocyclus*. It remained for a good many years unnoticed; but in 1884, Heynemann saw the original example, and declared it

[1] Ueber Aspidoporus limax Fitz., in Annalen des K. K. Naturhistorischen Hofmuseums, xiii, Heft I.

to be a deformed or abnormal *Amalia*. This view was adopted by Tryon and others; Mörch, Binney and Fischer having doubted the very existence of such a slug.

In examining the slugs of the Vienna Museum lately, Dr. Babor found Fitzinger's specimens, and he also obtained fresh individuals collected by Dr. Sturany in northern Steiermark, and by Dr. Werner in Montenegro. These specimens prove that *Aspidoporus limax* is not only a valid species, correctly observed by Fitzinger, but it belongs to a special group of at least subgeneric value.

The mantle is formed as in *Amalia*, having the impressed "horse-shoe," but there is a small orifice which in some specimens penetrates to the shell-sack, while in others it is merely a short, sharp impression, not penetrating through the mantle. The shell-plate is small and moderately thick. Pallial organs and nervous system as in *Amalia*, and the jaw and teeth are also not peculiar, except that the former is a little notched in the middle, below. The intestine is somewhat peculiar. There are six longitudinal folds, G_5 and the lower part of G_6 (forming the last posterior loop), being independent of the spiral torsion of the normal *Amalia* folds, lying to one side. There is no cœcum.

In the genital system the accessory gland (characteristic of *Amalia*), is completely wanting.

Dr. Babor, in discussing the systematic position of *Aspidoporus* and *Amalia*, gives evidence for regarding them as independent of the *Limacidæ*, and as a branch from the family *Helicidæ* (in the narrow sense). The main argument for this view is that the embryologic origin of the spermatheca is diverse in the two groups, *Amalia* being of the Helicid triaule type, while *Limax* is of the diaule type. An adequate discussion of this question would require more space than is available in this place; but it should be said that the well-developed pedal grooves show *Amalia* to be a typical Aulacopodous snail, and, therefore, far removed from the *Helicidæ:* while the particular modification of the retractor muscle system distinctly points to the *Limacidæ*. This is not likely to be a wholly independent parallel evolution. Moreover, I fail to see any such resemblance between the intestinal arrangements of *Aspidoporus* and the Helices as Dr. Babor alludes to, though the gut is wholly unlike that of *Limax*.

It is very gratifying to have the real existence of *Aspidoporus* proven, especially as the genus is undoubtedly more primitive than

Amalia, and a valuable link in the phylogenetic history of that group; and it is fortunate that the material fell into the hands of so competent a naturalist as Dr. Babor. H. A. P.

AGASSIZ ASSOCIATION DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association, by its General Secretary, Dr. W. S. Strode.]

SHELLS AND MASTODON.

[Extract from the report of Mr. W. Hilles Smith, Niles, Mich. From the Transactions of the Isaac Lea Conchological Chapter for 1899.]

Since my last report I have had the pleasure of gathering shells that were cohabitant with the Mastodon. About two miles west and a little north of the village of Buchanan, Berrien Co., Mich., is what is known as the Bakertown Marsh. In company with Prof. E. H. Frane, of Colon, Mich., who was hunting for remains of the Mastodon, I was hunting for remains of the mollusks, each in pursuit of his own hobby. The marsh had in former years been a lake about three miles long and one mile wide, and is now grown up to marsh grass without a sign of a tree in it anywhere, but in our excavations and along the large ditch was a layer or stratum of timber or drift wood, if such it might be called. The main part of our search was along the large ditch which is fully a mile long and runs through the middle of the marsh, made for the purpose of draining it, and all along on both sides of this ditch this layer of drift wood could be plainly seen. At one place was to be seen a large stone which would measure fully a cubic yard, lying right on top of this drift, and its weight had depressed the wood fully eight inches, showing unmistakable evidence of glacial drift. Some of the timber was as large as six inches in diameter, but the most of it was small and closely resembled our black oak of to-day. Commencing at the top and reading down, the strata appear as follows: Marsh bog, 16 inches. Recent peat, 20 inches. Peat and drift wood, 10 inches. Lake silt with no whole shells, 8 inches. Semi-ligneous peat, 12 inches. Shells and lake drift, 8 inches. Blue clay, 7 inches. Quick sand, 7 to 10 feet.

The skulls of the mastodon were found partly in and partly under the semi-ligneous peat, showing the shells to be as old or older than the mastodon. You may think, What has all this to do with shells? It is to give you, dear reader, some small idea of how long these shells have been lying there in what was once thought to be their last resting place, and how little the species differ from the same kind of the present day. The shells, so far as found, are as follows:

Limnæa stagnalis L., *L. desidiosa* Say, *L. humilis* Say; *Planorbis deflectus* Say, *P. parvus* Say, *P. bicarinatus* Say, *P. trivolvis* Say, *P. campanulatus* Say; *Ancylus rivularis* Say; *Amnicola limosa* Say, *A. lustrica* Pils.; *Campeloma integer* Say, *C. obesum* Lewis, *C. subsolidum* Anth.; *Physa ancillaria* Say, *P. heterostropha* Say, *P. integra* Hald.; *Strobilops labyrinthica* Say; *Succinea ovalis* Gld.; *Carychium exiguum* Say; *Valvata tricarinata* Say; *Zonites radiatulus* Ald.; *Pleurocera elevatum* Say, *Goniobasis livescens* Mke., *Margaritana rugosa* Bar., *M. deltoidea* Lea, *Anodonta subcylindracea* Lea, *A. footiana* Lea, *Sphærium simile* Say, *S. striatinum* Lam., *Pisidium compressum* Prime, *Unio pressus* Lea, *U. novi-eboraci* Lea, *U. ventricosus* Bar., *U. spatulatus* Lea.

All the shells are white and very frail except the *Pleurocera elevatum*, which is strong and still retains its coloring. The *Limnæa stagnalis* is larger than any that has come to my notice of the present day shells, some of them measuring over two inches long, and the *Planorbis campanulatus* and *bicarinatus* are also very large, larger than the present day shells of the same species. The *Valvata tricarinata* was also larger than any that I have seen and was quite plentiful.

One thing struck me as rather singular, that the shells seemed to be in colonies. For instance, take the whole line of that ditch, and there was only one place about a rod long where the *Pleurocera elevatum* was found, and the other shells had their localities where they were plentiful and almost none at all elsewhere. The *Valvata tricarinata* seemed to be as evenly distributed as any, and it was more plentiful in some places than it was in others.

There are many things to be found by a careful observer in overhauling a mass of such stuff as that lake drift. For instance, Prof. Cram in searching a lump of the dirt found a perfect skeleton head of a fly of the general appearance of our house fly, only larger, and we found unmistakable evidence of man by the presence of flint implements and horn tools.

GENERAL NOTES.

Bifidaria armifera var. nov. *ruidosensis.*—Shell only 4 mm. long, with the two outer teeth a considerable distance within the aperture. Three specimens collected by Mr. C. M. Barber in the nest of an ant (*Pogonomyrmex*) at Blackwell's Ranch, Ruidoso, New Mexico, Oct. 10, 1898, together with *Succinea avara*, *Cochlicopa lubrica*, *Helicodiscus lineatus*, *Vitrea indentata*, *Zonitoides arboreus*, *Leucocheila fallax* and *Vallonia gracilicosta.* The shells have quite a distinct appearance, and the locality is a long way from the ordinary range of *B. armifera.* Dr. Sterki, to whom I sent a specimen, says he has known the form for many years, and has seen it from Kansas, Missouri and Minnesota; he also states that he has seen true *armifera* from Mexico.—T. D. A. Cockerell.

The collection of the late H. D. Van Nostrand has been acquired by Columbia University, New York, where it will be suitably displayed.—S. R. R.

Among other interesting forms described by Professor Ralph Tate in the last volume of the Trans. Royal Society of South Australia, are five species of the curious genus *Philobrya*, from the tertiary and recent faunæ of Australia and New Zealand. The genus is referred to the family *Mytilidæ* by Tate, who gives a list of all the species now known. Though the shells are so small, the genus should be easily recognized by the peculiar spreading embryonic shells perched at the apices of the valves.

A New Species of Pristiloma.—Mr. E. G. Vanatta has recently described, with a figure, a new *Pristiloma* (*P. pilsbryi*) from Portland, Oregon. The summits of the whorls are nodulous "very much like *Macrochlamys diadema* Dall." (Proc. Acad. Nat. Sci. Phila., 1899.)

Another new form has recently been described by Mr. Pilsbry as *Pristiloma Taylori*, types having been collected by the Rev. Geo. W. Taylor at Nanaimo, Vancouver Island. The *Pristiloma arctica* of Lehnert, from Point Barrow, Alaska, is also figured in the same paper (Proc. Acad. Nat. Sci., Phila., 1899), and a key to the known species of the genus is given.

A New Variety of Polygyra monodon.—*P. monodon frierson*i: Shell large, alt. 7, greatest diam. 10½ mm., differing from the typical form in having 6½ whorls or over, which are more closely coiled and narrower in consequence of their greater number; base very convex, strongly swollen around the deep axial excavation; perforation very narrow and oblique. From Frierson, La., collected by Mr. L. S. Frierson. H. A. Pilsbry.

The Nautilus.

Vol. XIII. AUGUST, 1899. No. 4.

NEW SOUTHWESTERN FORMS OF POLYGYRA.

BY H. A. PILSBRY.

Mr. James H. Ferriss made a journey through Arkansas and the Choctaw Nation of Indian Territory, during February of this year. It was too early in the season for the best results with snails; they were partially torpid, and not readily flushed from cover; and while some log-rolling had to be done, Mr. Ferriss missed the excitement of moving half a ton of rock for each one, as he was accustomed to do in the Smokies. Nevertheless, some interesting things were collected. Near Texarkana, Ark., on the Red River, numerous specimens were taken of a variety of *Polygyra Dorfeuilliana*, agreeing with var. *Sampsoni* Wetherby, in the ample umbilical region, but differing in the heavy rib-striation of the whole base (*Sampsoni* being nearly smooth beneath), and in the almost marginal position of the upper lip-tooth, which is less immersed than in any of the other forms of the species. This form may be known as var. *percostata*. But Ferriss' greatest success was in stalking big game. It isn't everybody who can find unknown Polygyras nearly an inch in diameter; and Mr. Ferriss is prouder of it than a boy with a new knife.

The new form was at first thought to be *P. kiowaënsis* var. *arkansaënsis*, but a comparison with the types of that shell shows the new one to be quite different. As not many more large and distinct new Polygyras can reasonably be expected in these United States, and

the name of Mr. W. G. Binney has not yet been given to one of the genus, Mr. Ferriss unites with me in calling this one *Polygyra Binneyana* n. sp. (Binney's Mesodon).

It may best be described by a comparison with the most nearly allied species, *P. divesta* (Gld.). Shell of about the same depressed form as the large variety of *P. divesta*, narrow, its width contained 15–18 times in that of the shell, and half covered by the reflexed but not appressed lip. Color, brownish-yellow. Sculpture similar to that of the large variety of *divesta*, the surface being glossy and finely striated, showing under a lens very fine, close spiral striæ. Whorls $5\frac{1}{2}$, rather slowly increasing, the last becoming much wider, rounded at the periphery, a little deflexed in front, constricted behind the peristome. Aperture oblique, elliptical-lunate; peristome rather narrowly reflexed, with its face rounded and the edge a little recurved; baso-columellar margin arcuate, sometimes showing a very slight median callus.

Alt. $12\frac{1}{2}$, diam. 22 mm. (Hardy).

Alt. 11, diam. $19\frac{1}{2}$ mm. (Tushkahoma).

Typical *P. divesta* is very much more coarsely striated, with the umbilicus wholly covered by a well-developed, appressed callus, as in *P. albolabris*.

P. Binneyana occurred at Hardy, Sharp Co., in northern central Arkansas, and at Tushkahoma, Choctaw Nation.

Polygyra divesta was originally described from Arkansas, no special locality being given. The original specimens, of which two from Gould are before me, are very coarsely striated, with the lip flattened and not recurved at the edge, and measure $16\frac{1}{2}$ and 18 mm. in diameter. This rather coarse form is before me from the following localities:

Louisiana: Grand Cane, De Soto Parish, in N.-W. La. (Williamson).

Arkansas: Mabelvale, Pulaski Co. (C. W. Johnson) and Hot Springs, Garland Co., in the central, and Eureka Springs, Carroll Co. (Sampson) in the northwestern part of the State. Binney gives the locality Washita Springs.

Missouri: Chadwick, Christian Co., and Springfield, Greene Co. (Ferriss) both in the southwestern part of the State.

Kansas: Fort Scott, Bourbon Co. (Sampson), on the southeastern edge of the State.

Indian Territory: Port Gibson (C. T. Simpson), in the Cherokee County, northeastern part of the Territory.

Binney reports *divesta* from Vernon Co., Mississippi; but as there is no county of that name in that State, a reliable locality for the species east of the Mississippi river is still wanting. Probably the reference is an error for the parish in Louisiana of the same name.

In some of the lots the lip is quite narrow and recurved a little at the edge; and there is great variation in size, the smallest specimens being from Eureka Springs, Ark., and Springfield, Mo., with a diameter of 15 mm.; the largest are from Eureka Springs, Ark., and Grand Cane, La., and measure 19 mm. in greatest diameter. Binney gives measurements of a specimen 20 mm. diameter.

In the Indian Territory, at Limestone Gap, Choctaw Nation. (C. T. Simpson), and Tushkahoma, about 40 miles farther eastward in the Choctaw Nation (J. H. Ferriss, 1899), a large form occurs, diameter 21 to 27 mm., with glossy, shining surface and very fine striation, the last whorl proportionately wider than in the typical form, lip narrow and recurved. This is apparently a well-marked sub-species, and may be called *P. divesta indianorum.* It adds another to the small group of forms such as *P. jacksoni deltoidea* Simp., *P. cragini* Call, *P. kiawaensis* Simp., and *Vitrea Simpsoni* Pils., which give a certain individuality to the fauna of a small territory in this region. When the areas of the southwestern snails come to be mapped, as Mr. Bryant Walker has mapped the Michigan species, we will find that this tract has quite a number of special species and sub-species.

Polygyra vultuosa and allied species.

In the recently published catalogue, *P. vultuosa*, *Henriettæ*, *Copei* and *Cragini* were united as sub-species of the first. A careful review of the forms of this group, in the light of material and hints furnished by A. G. Wetherby, has caused some modifications of that arrangement, which was originally proposed by Mr. Binney. I would now define the southwestern species and sub-species of *Triodopsis* thus:

I. Basal lip with a keel on its face.

a. Keel slight, umbilicus narrow. *P. vultuosa.*

a^1. Keel very strong; aperture lunate; umbilicus wider. *P. vultuosa Copei.*

a^2. Keel strong; aperture triangular; spire higher. *P. vultuosa Henriettæ.*

II. No trace of a keel on the convex face of the basal lip.

a. Umbilicus small, showing the penultimate whorl only; striation fine. *P. Cragini.*

a[1]. Umbilicus wide, showing all the whorls within, cylindrical and wide at the bottom where the first whorl is prominently seen; striation coarser than in *Cragini*, base more convex, spire flatter; basal lip somewhat sinuous; teeth stronger, the upper one square, the basal tubercular; diam. 11–12 mm. *P. neglecta* n. sp.

The type locality of *P. vultuosa* is "Arkansas and Texas." This is rather vague; but I have collected the typical form in Calcasieu Parish in southwestern Louisiana and at Houston, Texas. Mr. Singley has sent it from Lee Co., Texas.

P. vultuosa Henriettæ (Mazyck, January, 1878) was described from "Eastern Texas." Forms probably referable to it, though certainly not typical, have been sent by Mr. Singley from Robertson Co., and Wheelock, Texas.

P. vultuosa Copei (Wetherby, March, 1878) was from Hardin Co., 20 miles N. of Beaumont, eastern Texas. I have it from Angelina Co., also (McDaniel).

P. Cragini (Call, Dec. 1886) originally came from the banks of Chetopa Creek, Neosho Co., southeastern Kansas. Mr. Jas. H. Ferriss collected it at Thayer, also in Neosho Co. Mr. Simpson got specimens at McAllister, in the eastern part of Indian Territory, and it extends south to Wood Co., in northeastern Texas. The sole locality in Arkansas is near Texarkana on the Red River (Ferriss). *P. Cragini* is easily distinguished from all forms of *vultuosa* by the total absence of a keel on the face of the basal lip. It is brown and glossy, usually between $7\frac{1}{2}$ and $9\frac{1}{2}$ mm. diameter, and the umbilicus is quite small.

P. neglecta (n. sp.) has been in our collection from several localities and collectors for some years, under the names "*vultuosa*," "*Cragini*," and "*fallax* var." It is much depressed, light yellowish-corneous, glossy and finely rib-striate, with five closely coiled whorls, the last much constricted and opaque behind the peristome and a little deflexed in front. Aperture small, "dished" as in *P. fraudulenta*, with a square tooth on the outer lip, bent inward, a smaller tubercular marginal tooth on the basal lip, and an abruptly bent parietal tooth, connected or almost connected with the colu-

mellar end of the peristome. The umbilicus is ample and deep, and *shows the base of the first whorl prominently at the bottom:* enlarged a little at the mouth by the deviation of the last whorl.

Alt. $5\frac{1}{2}$, diam. $12\frac{1}{3}$ mm. (Eureka Springs).

Alt. $4\frac{1}{2}$, diam. $10\frac{1}{2}$ mm. (Springfield).

This is a very constant and easily recognized form, without the keel on the face of the basal lip of *vultuosa*, the dark color, fine striation and raised spire of *Cragini*, and differing from both and from the large *P. fraudulenta* in the peculiar umbilicus. The localities are :

Southwestern Missouri: Springfield, Greene Co., and Pearson's Creek (A. G. Wetherby).

Eastern Kansas: Fort Scott, Bourbon Co. (F. A. Sampson).

Northwestern Arkansas: Eureka Springs (Sampson).

It will be seen that although the range of *P. neglecta* comprises localities in three States, they are not far removed from one another, and so far, the total area indicated for the species is remarkably small.

The only reference to this form in previous conchological literature is under the name

Triodopsis fallax, small variety, F. A. Sampson. Ann. Rep. Geol. Survey of Arkansas for 1891, ii, p. 189 (1893).

NOTES ON TWO VARIETIES OF PYRAMIDULA (PATULA) ALTERNATA (SAY).

BY GEORGE H. CLAPP.

In the American Journal of Conchology, Vol. 6, page 188, the late Dr. Jas. Lewis published a paper entitled "Notes on the Land Shells of East Tennessee," in which he gave a very brief description of *Helix alternata* Say *var. costata.*

As this variety is found in various collections under the names of Var. *mordax* and Var. *costifera,* it is thought that a description of it will prove of interest.

Pyramidula (*Patula*) *alternata* var. *costata* (Lewis). Shell flattened on upper surface, more convex below, carinated, heavily ribbed above, ribs ending *on the carina,* almost smooth below but ribs faintly continued into the umbilicus with light intermediate ribs

radiating from the umbilicus and ending at the carina. Color like the type, generally yellow or yellowish-white with very faint or no brown patches on under surface. Whorls about $5\frac{1}{2}$.

Greater diam. 19, lesser 17, alt. 9 mm.

Greater diam. 19, lesser $16\frac{1}{2}$, alt. 9 mm.

The very heavy ribs ending *on the carina* will serve at once to distinguish this from any of the other numerous varieties of *alternata*. There is a wide variation in the number of ribs on the body-whorl as the following figures will show:

Diam. 19 mm., 24 ribs.

Diam. 19 mm., 38 ribs.

Diam. $17\frac{1}{2}$ mm., 32 ribs.

So far reported from "East Tennessee" (Lewis) and Cades Cove, Blount Co., Tenn. (Ferriss & Clapp).

Another variety of *alternata* is found near Knoxville, Tenn. It is a large, coarse shell with rounded body-whorl and scarcely a trace of carination. Color dull brown with *very faint* darker markings, ribs low but fairly strong, epidermis very heavy and wrinkled, the wrinkles under a glass having a netted appearance like the venation in the wings of insects. Whorls $5\frac{1}{2}$.

Greater diam. $23\frac{1}{2}$, lesser 20, alt. $12\frac{1}{2}$ mm.

NEW SOUTHERN UNIOS.

BY BERLIN H. WRIGHT.

U. polymorphus, sp. nov.

Shell smooth, uniformly but moderately solid, red or dark red, very inequilateral, oval, oblong or subquadrate, rayless or with rays; posterior area smooth, wrinkled or subplicate; umbos flattened or inflated, umbonal ridge sharp and area abrupt, or ridge depressed and area flattened; base nearly straight or emarginate, dorsum arched, abruptly rounded in front and bluntly pointed behind; beaks not prominent; teeth solid in proportion to shell, laterals nearly straight or remarkably curved, prominent and well separated, double in the left and single in the right valve, cardinals quite oblique, usually disposed to be double in both valves and covered with shallow serrations; dorsal cicatrices in a row immediately under the posterior cardinal or under the dorsal plate, anterior cicatrices quite remote, very

deeply impressed and smooth, posterior cicatrices confluent; shell cavity moderate and uniform, beak cavity slight; nacre dead white, purple or pink, or a combination of these shades.

Diameter 1.25, length 2.00, width 3.75 inches.

Habitat: Spanish Creek, Okefenokee Swamp, Charlton Co., Ga.

Type lot in National Museum.

Remarks: This is one of the most variable forms we have ever handled. It belongs to the *forbesianus, vestitus, Moussonianus* group, with which we have tried hard to place it specifically. Out of several hundred specimens, none could be found that were typical of any of the above-named species. It is the connecting link between the beautiful *hartwrightii* of South Florida, and the group above named, of Georgia. It is usually rayless, though some of the younger forms are densely covered with broad green rays, and it becomes very rough and ponderous in old age. In view of the many phases it assumes, it has been thought best to select no one individual as a type, but to make the description broad enough to embrace all of its variations, and to deposit examples of all with the National Museum.

ADDENDUM: July NAUTILUS, p. 31, first line of description of *Unio danielsii* insert the words "yet black" after "solid."

(*To be continued.*)

ANNOTATED LIST OF LAND AND FRESH-WATER SHELLS RECENTLY COLLECTED IN THE VICINITY OF MIAMI, FLORIDA.

BY SAMUEL N. RHOADS.

The collection forming the subject of the following paper, was secured during a visit to Miami, covering a period of about four weeks, from January 12, 1899. The size and completeness of the collection is largely due to the field assistance of my kind friends, Messrs. Stevenson and Dickinson, of Miami, the former of whom has searched out the shells of South Florida for the past two years with commendable perseverance.

The classification of land species follows that of Pilsbry and Johnson's catalogue. The identifications were all made by Prof. H. A. Pilsbry, of the Academy of Natural Sciences of Philadelphia, where the collection is now located.

Family Cyclostomatidæ.

Chondropoma dentatum (Say). Miami; pine woods under flat rocks; very abundant.

Family Truncatellidæ.

Truncatella caribæensis "Sowb.," Rve. Miami. Found sparingly and only beneath the wet drift. Far above high-water mark on the bay side. Not found in similar positions in the tide-water limits of the Miami River, brackish water not seeming to agree with it.

Truncatella bilabiata Pfr. Miami. Abundant. The above notes on *caribæensis* are equally applicable to this associated species, which is easily distinguishable by its smaller size and dark coloration. It is ten times as numerous as the preceding.

Family Helicinidæ.

Helicina orbiculata Say. Miami and Lemon City. Abounding; especially in dense hammock at the bases of trees well under the vegetable mold in the winter season.

Family Helicidæ.

Cepolis varians (Mke.). Virginia Key. The remarks given under *Cerion incanum* equally apply to this shell. They are only found alive on "Hammock Keys." Virginia Key is too low for hammock growths.

Polygyra cereolus (Muhlf.). Virginia Key. A single bleached specimen taken on the beach.

Polygyra cereolus carpenteriana (Bld.). Miami and Virginia Key. Abundant and of universal distribution in all kinds of situations except muckland. The most abundant land snail of South Florida.

Polygyra septemvolva Say. Miami and Lemon City. The open muckland and wet prairie species, distinguished by large size, flatness and angularity. It is rare in the districts named.

Polygyra uvulifera (Shuttl.). Miami and Lemon City. Associated with *Chondropoma* under flat stones in pine woods in the proportion of one to ten of the latter. Rare in the wet lands.

Polygyra avara Say. Miami. Rare; only two specimens taken.

Polygyra pustula (Fér.). Miami. Another rare and strangely local species: found under decaying vegetation on the ground beneath oak hammock. Not taken in the pine woods.

Polygyra jejuna (Say). Miami and Lemon City. Local and generally rare, but abundant in colonies at certain seasons. On the underside of young cabbage palms in the early morning I found this neat species almost abundant in a small area near the standpipe in Miami. Elsewhere it was very scarce. It hibernates under stones in rock piles.

Thysanophora vortex (Pfr.). Miami. Abundant in most situations except the pine barrens.

Thysanophora dioscoricola cæca (Gpy.). Numerous in certain localities on the under surface of the leaves of magnolia and of palmetto. On the latter sometimes a score can be taken from a single leaf.

Thysanophora plagioptycha granum (Streb.). Miami. Only one specimen secured.

Family Bulimulidæ.

Drymæus dominicus Rve. Miami and Lemon City. Rare. The very young of this fragile snail are often found associated with *P. dioscoricola caeca*, but the adults are seldom seen.

Liguus fasciatus (Müll.). Miami. Abundant; distribution limited to a narrow strip of hammock lands bordering the bay not more than one-fourth of a mile wide. Not found in mangroves. Dark colored varieties rare and apparently confined to the most densely forested hammock. This snail is largely eaten by tree crabs, which bite the shells in half during their winter hibernation on the tree trunks. The numerous basal portions of the shells firmly cemented to the trees is evidence of the frequency of this destruction.

Family Urocoptidæ.

Urocoptis poeyana (Orb.). Miami. Abundant under stones in pine barrens. Perfect adult specimens with uninjured spires are very rare and when found exceedingly difficult to preserve.

Macroceramus pontificus (Gld.). Miami; rather rare; under edges of flat rocks.

Cerion incanum (Binn.). Virginia Key. Only dead shells of this species were found on this Key, whither they had probably been carried by the tide from some larger Key. All those secured were inhabited by crabs.

Family Pupidæ.

Strobilops labyrinthica Say (Pfr.). Miami and Lemon City; not rare, preferring moist hammock.

Strobilops hubbardi stevensoni Pilsbry. n. var. Miami. Rare: found only under bark of dead limbs in mangrove swamp. This subspecies was discovered by the writer in mangroves skirting the Bay close to the State Agricultural Experimental Station in the suburbs of Miami, and was found nowhere else. I requested Prof. Pilsbry to name it after my friend Mr. Stevenson, to whose conchological researches and friendly services the success of my work at Miami was largely due.

Bifidaria contracta (Say). Miami and Lemon City. Rather rare; in hammock mold.

Bifidaria servilis (Gld.). Miami. Very rare, only two specimens being secured.

Bifidaria pentodon (Say). Lemon City. Rare, one specimen only, from hammock.

Bifidaria rupicola (Say). Miami. Rare, in moist hammock under bark and leaves.

Bifidaria rhoadsi Pils., n. sp. Miami, very rare.

Family Achatinidæ.

Opeas octonoides (C. B. Ad.). Miami. Only found in damp mold under hammock trees along the high tide borders of the Miami River. Rare.

Opeas gracillima (Pfr.). Miami. Associated with the preceding, but less numerous. Sometimes found alive under rocks in same situations.

Family Glandinidæ.

Glandina truncata minor Pilsbry. n. var. Miami, Lemon City and New Smyrna. Abundant. This depauperate form rarely grows to more than half the size of largest *truncata*.

Family Zonitidæ.

Vitrea indentata (Say). Miami and Lemon City. Rarely associated with *Zonitoides arboreus*, which it so closely resembles.

Conulus chersinus (Say). Miami. Rare; associated with its more numerous and darker counterpart, *Strobilops labyrinthicus*, under moist rotten bark of open hammock.

Guppya gundlachi (Pfr.) Miami and Lemon City. Not common. Associated with *Zonitoides* and *Vitrea* under bark of logs.

Zonitoides arboreus (Say). Miami and Lemon City. Abundant.

Zonitoides dallianus (Simp.) Miami. Only eleven specimens found among two hundred *arboreus* collected.

Zonitoides minusculus alachuanus (Dall.) Miami, Lemon City and New Smyrna. This small white *Zonitoides* is found everywhere under decaying bark in damp hammock lands.

Family Vaginulidæ.

Vaginulus floridanus Binn. Miami. Not common. This seems to be the first record for *Vaginulus* from the east coast of the main land. Previous Florida records are from Charlotte Harbor and Punta Rossa.

Family Ampullaridæ.

Ampullaria depressa Say. Miami River and Everglades. Abundant.

Family Amnicolidæ.

Amnicola sanctijohannis Pilsbry. Miami River. Rare.

Potamopyrgus coronatus (Pfr.). Miami River. Rare; inhabiting small streams and ditches upon the aquatic vegetation in company with *Amnicola sanctijohannis*.

Family Auriculidæ.

Auricula pellucens Mke. Miami. This rare snail was found only in and under soft, rotten mangrove branches which lay on the mud in the mangrove swamps along the bay side. They have the power to deeply imbed themselves into the soft rotten wood.

Carychium exiguum (Say). Lemon City; locally plentiful in dark hammock under leaves and logs.

Melampus floridanus Shuttl. Miami. This rarer small species seems confined to the brackish water areas of the Miami River.

Melampus coffeus (Linn.). Miami. Abundant in salt water and more brackish areas, seeming to prefer mangrove swamps, but also in more open marshy places, where it ascends the higher sedges at certain seasons, apparently to deposit its eggs, as it does not seem to eat the grasses on which it is found.

Family Limnæidæ.

Limnæa cubensis Pfr. Miami River. A rare species.

Planorbis tumidus Pfr. Miami and Lemon City. In the edge of the Everglades at the head of the Miami River and in the ditches of the muck gardens in that neighborhood this animal abounded, associated with *intercalaris* in about equal numbers. It was rare in the Everglades proper.

Planorbis intercalaris Pilsbry. Miami and Lemon City. Abund-

ant. This is found sparingly associated with the following in the true Everglade territory.

Planorbis scalaris (Jay). Head of Miami River and Everglades adjacent. Rather rare. This peculiar form is most typical of the glades as contrasted with the *Planorbes* of the streams.

Planorbis dilatatus Gld. Lemon City. Rare; three specimens taken in a small stream.

Planorbis parvus Say. Lemon City. Only one specimen taken.

Planorbis cultratus Orb. Very rare. One specimen secured from a drainage ditch flowing into the Miami River two miles above its mouth. The type locality for *cultratus* is Cuba. It was subsequently found in Texas. This is the first record of it from Florida.

Ancylus peninsulæ Pils. & Johns. Miami and Lemon City. Rather rare. Taken on rotten leaves in still water.

Family Physidæ.

Physa heterostropha peninsulæ Pilsbry. Miami, Lemon City, Everglades, head of Miami River. Locally abundant, preferring small streams in swift water, where they are generally attached to weeds far below the surface.

Family Cyrenidæ.

Pisidium abditum Hald. Miami and Lemon City. This minute species is rare and difficult to secure alive.

Family Cyrenoididæ.

Cyrenoidea floridana Dall. Miami. Abundant locally in the outer edges of the Mangrove swamps skirting the bay.

Family Unionidæ.

Unio paludicolus Gld. Upper Miami River and Everglades. Rare, or at least difficult to secure, owing to its hiding among the roots of thick algæ in swift water. One was dredged in a small stream near the town.

Unio papyraceus Gld. Head of Miami River above the rapids. Only three specimens of this fragile *Unio* were dredged while forty of *paludicolus* were being secured. It is more than possible that Gould's types of these two species came from the Miami region and perhaps from the Miami River.

GENERAL NOTES.

Planorbis operculatus Var. oregonensis Van., Nautilus IX. p. 54, September, 1895, is preoccupied by *P. oregonensis* Tryon. Mon. Fresh-water Univalve Moll. of the U. S. 1870, p. 200. I would here propose the name *multilineatus* for my variety.—E. G. Vanatta.

THE NAUTILUS.

VOL. XIII. SEPTEMBER, 1899. No. 5.

ANOTHER NEW ASHMUNELLA.

BY H. A. PILSBRY AND T. D. A. COCKERELL.

Ashmunella thomsoniana porteræ, n. var.

Shell corneous, shining, with distinct lines of growth and minute spiral incised lines; umbilicus broadly exposing the penultimate whorl; whorls $5\frac{1}{2}$ to nearly 6; lip ochreous-tinged above and at the edge, the teeth white; parietal tooth well-developed, outer tooth long, basal tooth *always bifid*. Max. diam. 14–$16\frac{1}{2}$ mm.

Tentacles and dorsal surface of animal dark plumbeous; foot a lighter brownish-grey; exposed part of mantle grey. Genitalia as in typical *Ashmunella:* penis with the thick basal part 4 mm. long, the narrow terminal part (scarcely broader than the epiphallus) 3 mm.; epiphallus 28 mm. with the retractor muscle 3 mm. from its beginning (thus higher up than in *A. mierhyssa*); flagellum 1 mm.; spermatheca filiform, 21 mm. long including duct. Eggs pellucid white, 3 x $2\frac{1}{4}$ mm.

Beulah (Upper Sapello Cañon), New Mexico, 1899: numerous specimens collected by Miss Wilmatte Porter, after whom the variety is named. Other specimens later collected by Miss Helen Blake at the same place.

This form will fall into the first division of the two keys to the species of *Ashmunella* given by the writers in Proceedings of the Academy of Natural Sciences of Phila., 1899, p. 193.[1]

[1] "Ashmunella, a new genus of Helices," by H. A. Pilsbry and T. D. A. Cockerell.

The following modification of the key may be made:

a. Aperture strongly 3-dentate or 4-dentate.

b. Basal tooth simple, tubercular or somewhat elongate; diam. 12–13 mm. A. *thomsoniana.*

b[1]. Basal tooth distinctly bifid; diam. 14–16½ mm.; umbilicus wider. *A. thomsoniana porteræ.*

a[1]. Aperture toothless or without teeth on the outer lip, etc., etc.

To those who do not have access to Ancey's original description, it may be useful to have his note on the supposed variety *orobœna.* He says: "Very closely allied to the preceding [*thomsoniana*], being similar in the number of whorls and size, but differing in having the last whorl scarcely descending at its termination, higher, the aperture larger and less oblique."

These characters seem to be merely individual rather than racial. It is from the same locality as *A. thomsoniana.* Besides the specimens of *thomsoniana* in the Academy received from the late Mr. J. H. Thomson, of New Bedford, Mass., part of the original lot, we have received *A. thomsoniana* from Mr. Ashmun, who has lately collected a few specimens in Santa Fé Cañon, the original locality. The species differs widely from *Polygyra levettei*, which is not an *Ashmunella* but apparently a true *Polygyra.*

NEW SOUTHERN UNIOS.

BY BERLIN H. WRIGHT.

U. dispalans, sp. nov.

Shell uniformly thin, oblong-elliptical, flattened, inequilateral, smooth, with close slightly elevated growth ridges; anterior margin abruptly and uniformly rounded, base very slightly rounded, anterior abruptly pointed, dorsal margin straight; epidermis yellowish and nearly occulted by the light green fasciculated rays; beaks small and surrounded by four or five irregular undulating ridges; umbonal slope uniformly rounded or subangular; beak cavities slight; cicatrices smooth, slightly impressed and showing the successive nacreous layers, anterior ones distinct, posterior ones indistinguishable; dorsal notch very long and shallow, ligament long, depressed, thin; cardinal teeth low, very oblique, thin and obliquely striated, lateral teeth slender, long, nearly straight, double in the left and single in right

valve, and extending quite up to the cardinals by a fine thread-like elevation; dorsal plate entirely wanting; nacre silvery white, tinged with pink towards the beaks and more or less spotted with thin layers of vitreous-like matter; pallial line hardly discernible. Width $2\frac{1}{2}$, length $1\frac{3}{16}$, diameter $\frac{5}{8}$ inches.

Habitat: Suwannee River, Florida.

Type in National Museum.

Remarks: Affinity, *U. lamellatus* Lea. A large series of this shell has been in hand for two years and for a time it was doubtfully referred to *U. subinflatus* Con. Mr. Simpson compared them with authentic specimens of that species in the National Museum without being impressed with their likeness, but said they seemed nearer to that species than to any other. A comparison of the teeth with that of the Indian species, given as its affinity, leads to the conclusion that they should group together. The cardinals are shorter and more robust, but have the same direction and sculpture. At first glance the shell reminds one of *U. camptodon*, Say, but the radical differences in the beak sculpture and teeth clearly distinguish it from members of that group.

To be Continued.

PLANORBIS RUBELLUS STERKI, AND P. HARNI PILSBRY.

BY H. A. PILSBRY.

In this Journal for April, 1891, Mr. E. H. Harn gave a list of the shells found in western Pennsylvania, chiefly around his home in Blairsville. A few of the species had been submitted to me for determination, among them a *Planorbis* of the *exacutus* group, which I consider a new species, or possibly a new variety of *exacutus*. This was entered in the list as "*Planorbis* (? var.) *Harni* Pilsbry." (Nautilus IV, p. 137.) I intended at the time to describe the species; but other matters crowded it out of mind, and the name remains a nude one to this day.

Mr. E. G. Vanatta has recently called my attention to the specific identity of my types of *P. Harni* with a form received from Dr. V. Sterki as "*P. exacutus* var. *rubellus*." This variety was described by Dr. Sterki on page 7 of a privately printed brochure entitled "The Land and Fresh Water Mollusks in the vicinity of New Philadelphia," (Beobachter Press, New Philadelphia, Ohio, 1894).

As Dr. Sterki stated the differential characters of his variety while my own was without a description, his name for it will stand, my *P. Harni* becoming a synonym, though several years earlier in date.

The species is smaller than *P. exacutus*, the last whorl seen from above less wide, the suture deeper and the apex a little more sunken. Below, the umbilicus of *P. rubellus* is very much wider and less deep, and the last whorl is consequently far narrower than in *exacutus*, and the aperture is smaller. As in *exacutus*, the form is biconvex and the periphery acutely keeled, color reddish corneous. Alt. 1, diam. $4\frac{1}{2}$ mm., or somewhat smaller.

The localities now known are as follows: Pennsylvania: Blairsville, Indiana Co., in a small stagnant pond, adhering to the under sides of dead leaves (E. H. Harn, March, 1889). Ohio: Tuscaroras Co., near New Philadelphia.

There is also a tray of 8 specimens in our collection without locality record.

The shells seem always to be covered with a ferruginous crust. I regard *P. rubellus* as specifically distinct from *P. exacutus*, the characters being quite constant in the series of some twenty-four specimens examined. *P. exacutus* is a wide-ranging species, extending from New England to New Mexico.

COLLECTING ON THE GULF COAST OF FLORIDA.

BY E. J. POST.

The keys at the entrance to Tampa Bay, are perhaps one of the most favorable collecting grounds on the gulf coast. The result of a twelve days' trip in March is shown by the accompanying list, with the number of specimens collected; most of the collecting was done at Pass-a-Grille, Long Key, and the north end of Mullet Key. All dredging was done with a small hand sieve at low tide. *Haminea succinea* were very abundant in the drifts between Point Pinellas and St. Petersburg. *Melampus coffeus* and *M. coffeus* var. *gundlachi*, were collected on the south end of Long Key; they were unusually large and fine. There was an immense wash of *Bittium varium* ashore, the second that has come under my observation in eight years collecting. Helices were very abundant on Long Key. I collected 175 specimens under one thistle, 85 of which were *Polygyra uvulifera*,

the other being *P. cereolus* and the var. *carpenteriana*. Very large specimens of *P. cereolus* were also collected on Mullet Key.

List of Species Collected.

Anomia simplex Orb. . . . 80
Pecten dislocatus Say. . . 1
Pecten nucleus Born . . . 205
Avicula atlantica Lam. . . 1
Modiola tulipa L. 25
Modiola plicatula Lam. . . 50
Modiolaria lateralis Say . . 15
Nucula proxima Say . . . 1
Cardita floridana Conr. . . 370
Parastarte triquetra Conr. . 12
Lucina floridana Conr. . . 12
Lucina costata T & H. . . 4
Lucina crenulata Conr. . . 1
Lucina lintea Conr. 12
Cardium magnum Born . . 6
Cardium isocardia L. . . . 1
Cardium mortoni Conr. . . 30
Venus cancellata L. . . . 20
Venus rostrata Sowb. . . . 295
Cytherea hebræa Lam. . . 4
Cytherea conradina Dall . 12
Cyrena floridana Conr. . . 75
Donax variabilis Say . . . 3
Tellina alternata Say . . . 2
Macoma tampaënsis Conr. . 4
Solen americana Gould . . 70
Dentalium disparile Orb. . 6
Dentalium eboreum Conr. . 4
Actæon punctostriatus C. B. Ads. 1
Tornatina canaliculata Say. 17
Bulla occidentalis A. Ads . 6
Haminea succinea Conr. . 170
Melampus coffeus L. . . . 320
Melampus coffeus var. gundlachi Pfr. 170
Marginella minuta Pfeiffer. 900
Marginella succinea Conr. . 4
Fasciolaria gigantea Kiener. 2
Fasciolaria tulipa L. . . . 27
Fasciolaria distans Lam. . . 36
Fulgur pyrum Dill 6
Fulgur perversum L. . . . 45
Melongena corona Gruel . 40
Nassa vibex Say. 1144
Columbella rusticoides Heilp. 95
Columbella avara Say. . . 22
Columbella similis Ravenel. 10
Columbella lunata Say . . 54
Murex rufus Lam. 2
Eupleura caudata Say. . . 2
Urosalpinx perrugatus Conr. 100
Eulima gracilis C. B. Ads. 21
Pyramidella candida Mörch. 298
Turbonilla conradi Bush. . 460
Turbonilla hemphilli Bush } 235
Turbonilla dalli Bush . . }
Caecum floridanum Stimp . 1
Meioceras nitidum Stimp. . numerous
Syrnola caloosaensis Dall. . 5
Pyrula papyratia Say . . . 3
Erato maugeriæ Gray . . . 1
Cerithiopsis emersoni C. B. Ads. 1
Bittium varium Pfeiffer numerous
Cerithium floridanum Mörch. 140
Cerithium muscarum Say . 210
Cerithium minimum Gruel. 6
Cerithidea scalariformis Say 210
Modulus floridanus Conr. . 498

Terebra dislocata Say. . .	1	Vermicularia spirata Phil .	110
Terebra protexta Conr. . .	20	Litorina angulifera Lam. .	296
Conus pealii Green	95	Rissoina chesnelii Michaud.	338
Drillia leucocyma Dall. . .	10	Crepidula fornicata L. . .	4
Drillia thea Dall	20	Crepidula plana Say . . .	5
Mangilia biconica C. B. Ads.	85	Crepidula aculeata Gruel .	7
Mangilia stellata Stearns .	65	Natica pusilla Say	120
Mangilia cerinella Dall . .	25	Neverita duplicata Say . .	2
Oliva literata Lam. . . .	6	Sigaretus perspectivus Say.	23
Olivella mutica Say . . .	1450	Ischnochiton papillosus C. B. Ads.	20
Olivella floralia Duel . . .	12	Acanthochites spiculosus Reeve	15
Olivella bullula Reeve (young)	60	Polygyra cereolus Muhlf. .	440
Marginella aureocincta Stearns.	150	Polygyra cereolus Carpenteriana Bland	96
Marginella apicina Menke .	630	Polygyra uvulifera Shutt. .	2070
Marginella denticulata var. opalina Stearns	54	Succinea campestris Say. .	35

NOTES ON POLYGYRA APPRESSA.

BY G. H. CHADWICK.

In Messrs. Pilsbry and Johnson's recent catalogue of North American Land Shells, *Polygyra* (*Triodopsis*) *appressa* (Say), is accredited to Scott Co., Va., among other localities. A fine series from that locality having come under my notice, I perceived a considerable difference between them and northern specimens, and a careful examination and comparison with examples of the typical form from Bernadotte, Ill., and *var. perigrapta* Pilsbry, from Tennessee, seem to fully confirm the distinction.

The Virginian variety, for which I propose the name *sculptior*, may be known by the following characters:

Surface *costulate* above, horn-colored inclining to reddish chestnut, becoming smoother and greenish beneath, entirely covered with a fine *spiral granulation;* upper lip-tooth obsolete; parietal tooth as in typical *appressa*. Diam. 14 to 18 mm.; alt. 7 to 9 mm.

While the warm color and coarse ribs are noticeable and constant features, the microscope discloses the most important diagnostic char-

acter, namely the beautiful fine granulation which covers even the ribs and shows a markedly spiral arrangement. This is quite different from the spaced spiral incised lines of *perigrapta*, which while slightly waved, cut the growth striæ so regularly as to produce a cancellated effect, the intervening surface being moreover always marked with excessively fine vertical scratches. A compound lens reveals incised spirals in typical *appressa* also, but exceedingly minute and rather irregular or punctate. Finally, in *sculptior* the whorls are generally narrower and more convex than in either of the other forms. In the tray-full examined there was but a single departure from the normal, and that was a *tridentata!*

The types are deposited with the Academy of Natural Sciences, Philadelphia.

SUPPLEMENTAL NOTE ON THE MOLLUSCA ASSOCIATED WITH THE MASTODON IN BERRIEN COUNTY, MICHIGAN.

BY BRYANT WALKER.

The material which formed the basis of Mr. W. Hilles Smith's interesting paper in the July Nautilus, is the same covered by my article in the Nautilus for March, 1898 (Vol. XI., p. 121). The undetermined Pisidia there mentioned have been submitted to Dr. Sterki, who, with his usual good nature, has determined them as follows:

1. *Pisidium pauperculum* St.
2. *Pisidium* sp. near "*abditum*," Distinct.
3. *Pisidium* sp. "near *abditum*."
4. *Pisidium roperi* St.
5. *Pisidium mediauum* St.
6. *Pisidium* sp. "Resembles most vesiculare."
7. *Pisidium ventricosum* Prime.
8. *Pisidium milium* Held.

In this connection it is interesting to note that these forms are identical with those from the marl deposits in Tuscola County, which were examined by Dr. Sterki at the same time. This not only goes to prove that these shells were contemporaneous with the mastodon, but also that the post-pleistocene fauna was substantially the same throughout the lower peninsula of Michigan.

NEW JAMAICAN FORMS OF LUCIDELLA.

BY HENRY A. PILSBRY.

There are in Jamaica three strongly marked specific stocks of *Lucidella: L. aureola* Fér., with the variety *undulata; L. depressa* Gray (placed by Pfeiffer in *Helicina*), with the aperture like *aureola*, but the shell smaller, more depressed, and weakly sculptured; and *L. lineata* C. B. Ad., of which *L. nana* Pfr., is doubtless a variety or synonym. These are quite small, with a strong, squarish tooth on the basal lip, and strong, sharp spiral liræ.

Another well marked species of the *lineata* type was collected by Messrs. Wm. J. Fox and C. W. Johnson in a cave at Port Antonio, on the northeastern coast of Jamaica.

L. Foxi, n. sp.

Shell with the depressed general form, size and color, and the acute liræ, of *L. lineata* Ad.; the liræ bearing sparse, rather long and equidistant prostrate hairs, easily rubbed off. Whorls $4\frac{1}{2}$, the last compressed but not keeled at the periphery, descending in front, excavated at the umbilical region, which is covered by a thin callus which is sparsely and very minutely asperulate or roughened by minute pointed granules. Aperture very oblique, subtriangular, the outer and *upper margins expanded, scalloped*, with four to six projecting points; the basal margin narrowly reflexed; basal lip bearing a large, squarish, projecting tooth, as in *L. lineata;* upper margin with a tubercular tooth well removed inward from the lip-edge; *outer lip with a small tubercular tooth*, distinctly developed only in fully mature specimens.

Alt. 2, diam. 3.8 mm., or smaller, diam. 3.5 mm.

Cave at Port Antonio.

L. trochiformis n. sp.

Small and distinctly trochoidal, the base flattened, smooth except for some radial wrinkles, and one or two spiral threads close to the periphery; upper surface convexly conoidal, radially undulated and spirally lirate; periphery acutely carinated and irregular or serrate; whorls $4\frac{1}{2}$, but slightly convex, the last a little deflexed, somewhat impressed in the axial region below. Aperture oblique, triangular, the lip narrowly reflexed; basal lip being a prominently projecting, squarish tubercle, upper margin with a small submarginal tubercle,

and there is another smaller one on the outer lip below the external angle.

Alt. 2, diam. 2.7 mm.

Differs from *lineata* and *Foxi* in the trochiform shape, almost complete freedom from spiral threads on the base, and in the acute periphery. It has a small tubercle on the outer lip, as in *L. Foxi*, a larger species with sculptured base, rounded periphery, scalloped upper lip and different contour.

The specimens were found associated with *L. lineata.*

NOTES ON THE MOLLUSCA OF OWASCO LAKE, N. Y.

BY FRANK C. BAKER.

Recently the Chicago Academy of Sciences has received from Dr. Howard N. Lyon, of Chicago, a fine lot of the shells of Cayuga Co., N. Y., collected for the most part by himself about Owasco Lake and River. Dr. Lyon was very precise concerning his data, and for this reason a list of the species in the collection may be of value.

For brevity I have used the following symbols for localities :

* Near Auburn, in Owasco River.

** Hayden's Mills, six miles below Auburn.

† Foot of Owasco Lake.

‡ Cascade.

†† Marsh at foot of Owasco Lake.

‡‡ North end of Owasco Lake.

1. *Alasmodonta rugosa* Barnes,*† July, 1893.

2. *Alasmodonta pressa* Lea,*† in brook four miles north of Auburn, July 1893 and 1882.

3. *Strophitus edentulus* Say.†

4. *Unio complanatus* Solander,* in South Street Brook, July, 1879.

5. *Anodontopsis subcylindraceus* Lea,* in South Street Brook, various collections from 1880 to 1885.

6. *Lampsilis luteolus* Lam,* July, 1883.

7. *Sphærium simile* Say,* in South Street Brook, 1882.

8. *Vallonia pulchella* Müller, April, 1882.

9. *Polygyra albolabris* Say.‡

10. *Polygyra thyroides* Say, var. *bucculenta* Gould.‡

11. *Polygyra palliata* Say.‡

12. *Polygyra tridentata* Say.‡

12*a*. *Polygyra tridentata* var. *juxtidens* Pilsbry.‡

12*b*. *Polygyra tridentata* var. *bidentata* Baker.‡

13. *Polygyra monodon* Rackett.‡

Nos. 9 to 13 were collected on a well wooded limestone hill, well watered.

14. *Bifidaria armifera* Say.*

15. *Pupa muscorum* Linné, Auburn. Common in damp grass throughout the city, often found in private grounds.

16. *Vertigo milium* Gould,** 1880.

17. *Cochlicopa lubrica* Müller,** 1880 and 1876, on driftwood in Owasco River at Auburn.

18. *Omphalina fuliginosa* Griff.‡ 1883.

18. *Vitrea hammonis* Ström,** April, 1882.

20. *Conulus fulvus* Müll.,** on roots of grass near edge of river, April, 1882.

21. *Zonitoides arboreus* Say.‡

22. *Zonitoides nitidus* Müller,** April, 1882.

23. *Gastrodonta ligera* Say,** April, 1882.

24. *Agriolimax campestris* Binney.

25. *Pyramidula alternata* Say,* very abundant in low meadows, under bark of trees and the under side of logs where the ground is partially shaded.

26. *Helicodiscus lineatus* Say.‡

27. *Succinea retusa* Lea, †† on logs and trunks of trees near high water mark, July, 1880.

28. *Succinea avara* Say, †† July, 1880, in company with the above.

29. *Limnæa palustris* Müller, †† 1884.

30. *Limnæa emarginata* Say, †† ** also in Owasco River, at foot of lake, 1880, and April, 1882.

31. *Limnæa desidiosa* Say, ‡‡ on weeds, 1880.

33. *Planorbis bicarinatus* Say, †, 1881, Port Byron, 1883.

34. *Planorbis trivolvis* Say, † old and new outlets, 1880, Port Byron.

35. *Planorbis campanulatus* Say, * 1882, also in brook emptying into lake at Cascade.

36. *Planorbis parvus* Say, * on big dam.

37. *Physa heterostropha* Say,* Port Byron, 1879 to 1882.

38. *Physa ancillaria* Say, †† 1879 to 1885.

39. *Aplexa hypnorum* Linne, †† 1883.

40 *Valvata tricarinata* Say, * found in driftwood at the tail race of the "Big Run," spring of 1881.

41. *Campeloma decisum* Say, † Owasco River near Owasco Lake, August, 1882, also in Owasco River three miles below lake.

AGASSIZ ASSOCIATION DEPARTMENT.

[Conducted in the interest of the Isaac Lea Conchological Chapter of the Agassiz Association, by its General Secretary, Dr. W. S. Strode.]

During the last year I have done all the work possible towards collecting the Pisidia of the northeast of Maine. About 50,000 specimens have been obtained and worked over by Dr. V. Sterki of New Philadelphia, Ohio. The material has been finely preserved in nearly every locality. The cold water of our streams is favorable for the development of this minute clam. In all about twenty species and some varieties have been obtained. Many of these species have proved new to the State, and a few have been published by Dr. Sterki as new species. A part are very difficult to identify until a larger amount of material is obtained. It sometimes results that among thousands of specimens there will be only one individual representing a certain species. *Pisidium contortum* Prime, has been found living in a small lake in the northeast of Perham. It had heretofore only been found fossil, in Maine and Massachusetts.

The little *Pisidium milium* Held, so common in the north of Europe (a straggler like myself), has been found living in the south branch of Caribou stream in Woodland. It is curious how this little creature came across the ocean.

Two years ago I found *Planorbis crista* Lin., var. *cristata* Drap., a species of Northern Europe, in Barren Brook, Caribou. This summer I have found it fossil in the marl deposit of Lovely Brook in the town of Fort Fairfield. I think this is proof that it was not imported by any accident or in the outfit of any emigrant coming to this continent. In my last report I had about 81 species collected in this region. This year I have of land shells 33 species, fresh water gastropoda 23 species, and of Unio 1, Margaritana 2, and Anodonta 1 species; Sphærium 5, and Pisidium 20 species and several varieties.

Total 85 species. The *Pisidia* will be published by Dr. Sterki, and the results will thus be made known to those interested in these little animals. OLOF O. NYLANDER.

GENERAL NOTES.

We regret to record the death on August 16th of Dr. W. D. Hartman, of West Chester, Pa. Further notice will appear next month.

POMATIA ASPERSA IN CALIFORNIA.—I found a fine living specimen of *Pomatia aspersa*, Müll., this summer at Pacific Grove, California. A small colony of this European snail was established many years ago at San José, more than fifty miles from the spot where this specimen was found. The species is apparently becoming naturalized. —*Josiah Keep.*

POLYGYRA BINNEYANA.—Owing to hasty proof reading, several errors appear in the article on "New Southwestern Forms of Polygyra" in the July issue. On page 38, sixth line from top, the word *umbilicus* should be inserted between *divesta* and *narrow*. On p. 39, second line, for "county" read "country."—*H. A. P.*

THE BRITISH PLIOCENE NON-MARINE MOLLUSCA are revised by Messrs. A. S. Kennard and B. B. Woodward, in Proc. Malac. Soc., Lond. III., pt. 4, March, 1899. "It is in the Red and Norwich Crags that the genesis of our present molluscan fauna is to be sought. It is a noteworthy fact that many of our existing species are met with for the first time in these beds, and are not known to have existed on the continent until a much later date. This may result from the imperfection of the geological record, or it may indicate that these forms have been derived from a region to the northward." Of 38 species discussed, 6 are extinct. 6 species, *Corbicula fluminalis*, *Helix lactea*, *Hygromia rubiginosa*, *H. incarnata*, *Helicodonta lens*, and *Eulota fruticum* are now extinct in England, though living on the continent; *C. fluminalis* and *Eulota fruticum* having existed to the Post-Pliocene. It is interesting to find that *Eulota* extended in the Pliocene so far to the westward. *Helix lactea* and *Helicodonta lens*, each represented by very scanty but apparently authentic material, are now restricted to the circum-Mediterranean fauna. One new species, *Paludestrina Reevei*, is described from the Norwich Crag. It is allied to the Upper Oligocene and Lower Miocene *P. obtusa* (Sandb.) of Germany.

DR. WILLIAM D. HARTMAN.

The Nautilus.

Vol. XIII. OCTOBER, 1899. No. 6.

WM. D. HARTMAN, M. D.

Dr. William Dell Hartman, whose dealh occurred on August 16th, at West Chester, Pennsylvania, was born in East Pikeland township, Chester county, Pa., December 24, 1817. He was the eldest son of General George Hartman. The founder of the Hartman family in Chester county was his great-great-grandfather, John Hartman, a native of Schwerin, Hesse Cassel, Germany, who came to Philadelphia in 1753.

After receiving an education in the schools of the neighborhood, William Hartman attended the famous school of Jonathan Gause and the academy of Jonathan Strode. He studied medicine with Dr. Wilmer Worthington and about that time became profoundly interested in the study of botany. Dr. William Darlington, in his "Flora Cestrica," mentioned him as "a zealous and promising young botanist." He attended the University of Pennsylvania and graduated from the Medical Department in 1839, at the age of twenty-one years. After graduation he returned to West Chester and engaged in the practice of his profession. His practice soon became very extensive and was maintained until the infirmities of advanced years compelled him to relinquish it. Even then many patients visited him at his office.

Dr. Hartman devoted all the time that could be spared from his medical practice to the study of natural science. Besides botany, he studied entomology, mineralogy and conchology, and became an

authority in each of these branches, especially as they related to Chester county. The latter science, however, finally engrossed Hartman's attention; and it is by his work on mollusca that he became most widely known. For over forty years he corresponded upon conchological topics with the leading authorities in the science in this country and abroad. Among his correspondents and co-laborers were Isaac Lea, LL. D., of Philadelphia; Charles Wheatley, of Phœnixville; George W. Tryon, Jr., J. G. Anthony, Dr. J. C. Cox, Andrew Garrett, W. H. Pease, E. L. Layard and many others.

Through Mr. Garrett he obtained what is perhaps one of the finest collections of Polynesian land shells in the world, especially of the genus *Partula*, of which he described 25 species. The critical study of the genus *Partula* particularly engaged his attention during several years; and his careful work and extensive writings on the group, have given him high rank as an authority thereon. His beautiful collection of *Achatinellidæ* was purchased by the Bremen Museum some time before his death. The last conchological work that Dr. Hartman undertook was a revision of the *Helicinidæ*. He gathered much interesting material, but failing health prevented the carrying out of his intentions. His collection of marine shells is rich in Polynesian species and contains many varieties.

One of the best known publications from the pen of Dr. Hartman was "Conchologia Cestrica," treating of the mollusca of Chester county, Pa. In its preparation he was associated with the late Dr. Ezra Michener, of New Garden township, but Dr. Hartman did the larger part of the work. It is illustrated with 207 wood-cut figures of shells described in the work. This book, published in 1874, was formerly used as a text-book in many schools in Chester and Delaware counties.

He was also the author of the following papers:

Opercula of the family Strepomatidæ. Amer. Jour. Conch. vi, 316, 1871.

Description of a Partula supposed to be New, from the Island of Moorea. Proc. Acad. Nat. Sci., Phila., 229, 1880.

A catalogue of the genus Partula Fer. (privately printed in West Chester), 1881.

Observations on the species of the genus Partula Fer., with a Bibliographical Catalogue of all the species. Bull. Mus. Comp. Zoöl. ix, No. 5, pp. 171–190, 1882.

Observations on the duplicates of the Genus Partula Fer. contained in the Museum of Comparative Zoölogy, Cambridge, Mass., formerly belonging to the collection of the late Wm. H. Pease, Bull. Mus. Comp. Zoöl. ix, pp. 91–96, 1882.

Descriptions of new species of Partula and a synonymic catalogue of the genus. Proc. Acad. Nat. Sci., 203–223, 1885.

New species of Partula from the New Hebrides and Solomon Islands. Proc. Acad. Nat. Sci., 30–35, pl. ii, 1886.

A bibliographic and synonymic catalogue of the genus Auriculella, Pfeiffer. Proc. Acad. Nat. Sci., 14, 1888.

A bibliographic and synonymic catalogue of the genus Achatinella. Proc. Acad. Nat. Sci., 16–56, 1888.

New species of shells from the New Hebrides and Sandwich Islands. Proc. Acad. Nat. Sci., 250, pl. xiii, 1888.

New species of shells from New Hebrides. Proc. Acad. Nat. Sci., 91–94, pl. v, 1888.

Descriptions of new species of shells. Proc. Acad. Nat. Sci., 284–288, pl. iii, 1890.

Catalogue of the genus Partula. THE NAUTILUS, vi, 73 and 97, 1892.

Melania yokohamensis, new species. THE NAUTILUS, xi, 41, 1897.

Dr. Hartman was elected a corresponding member of the Academy of Natural Sciences of Philadelphia in 1853, and the same year he was elected a corresponding member of the Lyceum of Natural History of New York city. He was a member of the West Chester Historical Society and one of its organizers; also a member of the West Chester Philosophical Society, the Geological Club of Chester County, and an honorary member of the Chester County Medical Society. He was a member of the Episcopal Church.

In 1883 Dr. Hartman went abroad, visiting the British Museum, Jardin des Plantes and other museums.

Personally Dr. Hartman was of a most kindly disposition and social so far as his busy life would allow. His kindness professionally and to his scientific friends and co-workers was unlimited. He was ever ready to assist young men in their studies in the various branches of science, and many owe their first impulse to his encouragement and kindly assistance.

Dr. Hartman married Mary Jane Kabel, a daughter of John Kabel, of Jefferson county, West Virginia, on December 3, 1841. Mrs. Hartman survives her husband, as do also five children.

MOLLUSKS COLLECTED BY R. C. McGREGOR IN NORTHERN CALIFORNIA.

BY HENRY A. PILSBRY.

Mr. R. C. McGregor being engaged during the summer of 1898 in Fish Commission work which took him over a considerable area in northern California, interested himself in the collection of mollusks, which he sent me for study.

The region is one which has been very superficially examined hitherto, and it is not surprising that a number of very interesting species were found. But few land shells were taken, among them the extremely rare *Polygyra roperi*, and a peculiar *Circinaria*. *Pyramidula striatella* occurred in many localities, the specimens being referable, probably, to the ill-defined variety *cronkhitei*.

Among the fresh-water pulmonates, the re-discovery of *Ancylus patelloides* Lea, a species falling into Clessin's genus *Lanx*, and *A. altus* Tryon, also a *Lanx*, are the most important finds. These species will be fully treated elsewhere, with illustrations of the anatomy.

The series of *Goniobases* collected induced me to attempt a revision of the West American species, the results of which are included below.

The list of species is as follows:

Epiphragmophora mormonum (Pfr.). Redding, Shasta Co.

Polygyra loricata (Gld.). Battle Creek, s. boundary Shasta Co.

Polygyra roperi (Pils.). Redding, Shasta Co. One adult specimen.

Vallonia pulchella (Müll.). Redding, Shasta Co.

Circinaria sp. undet. Redding. I cannot refer the single fresh adult shell collected to any of the described forms.

Pyramidula striatella (Anth.). Goose Lake, Modoc Co.; Duck Lake, 20 miles west of Susanville, and Eagle Lake, Lassen Co.; Bartle's, Siskiyou Co., on McCloud River.

Vitrea hammonis (Ström). Bartle's and Duck Lake.

Vitrina pfeifferi Newc. Bartle's and Duck Lake.

Zonitoides arboreus (Say). Goose Lake, Modoc Co.

Succinea nuttalliana (Lea). Goose Lake, Modoc Co.

Succinea stretchiana (Bld.). Duck Lake and Bartle's.

Limnæa stagnalis (L.). Upper waters of Willow Creek, trib. to Susan R., Lassen Co.

Limnæa proxima (Lea). South Fork Pitt R., Modoc Co.

Limnæa desidiosa (Say). Redding (reported as *L. adelinæ* on p. 60 of vol. xii.).

Limnæa humilis (Say). Duck Lake, Lassen Co.

Pompholyx effusa (Lea). Shasta Co. in the Sacramento R. at Redding, in Battle Creek, and Pitt R. below the falls; Grasshopper Lake, Lassen Co.; also Klamath River at Klamathton, Siskiyou Co.

Carinifex newberryi (Lea). Eagle Lake; Head of Fall River, southeastern Siskiyou Co.

Planorbis trivolvis hornii Tryon. Upper waters of Willow Creek, Lassen Co.

Planorbis parvus Say. Duck Lake, Lasson Co., and a small sinking creek on Van Loan's ranch, 20 miles S. of Alturas; also Redding, Shasta Co.

Ancylus oregonensis Clessin. Redding.

Lanx patelloides (Lea). Shasta Co., at Redding, Battle Creek, and Pitt R. below falls. At the latter two localities a spotless form or variety occurs, associated with spotted specimens.

Lanx altus (Tryon). Klamath River at Klamathton, Siskiyou Co. This is probably only a variety of Lea's *Ancylus newberryi*, but it is rounder and higher, and the young are more conic and not elevated at the ends as in *L. newberryi*.

Physa triticea Lea. Battle Creek, S. border of Shasta Co.; S. Fork Pitt R. at South Fork P. O., Modoc Co.; West Fork Feather R., Morgan Spr., Plumas Co.; Duck Lake and Willow Creek, Lassen Co.; Dunsmuir, Siskiyou Co. A common species in northern California, originally described from young specimens.

Goniobasis plicifera (Lea). Klamath River at Klamathton, Siskiyou Co. A form heavily striate throughout, but folded on the earlier whorls only.

Goniobasis nigrina (Lea). Battle Creek, southern boundary of Shasta Co., 10 miles above its mouth; West Fork Feather River, Plumas Co.; small spring at Eagle Lake, Lassen Co.; headwaters of Fall R., southeastern Siskiyou Co.

Goniobasis occata (Hinds.). Battle Creek, southern boundary of Shasta Co. The upper keels are generally nodose, as in *G. acutifilosa*, which is evidently a form derived from *occata*.

Goniobasis acutifilosa (Stearns). Small creek at Eagle Lake. Sculpture less strong than in the typical form.

Goniobasis acutifilosa siskiyouensis n. v. Excessively variable in

sculpture, spiral carinæ wholly absent on the last whorl or two, or reduced to two or three low angles; or when developed, more numerous and less prominent than in the type form. Contour about as in *acutifilosa*. Based upon a series of 94 shells from the headwaters of Fall River, S.-E. Siskiyou Co. There is also a series of the same form in the collection labelled "*G. circumlineata* Tryon, California."

The *Goniobases* of the West Coast are fully as variable as those of the East; and far too many species have been made. The following synopsis is believed to be in accordance with the facts.

a. Earlier (or all) whorls longitudinally costate. *plicifera*.

*a*¹. Earlier (or all) whorls spirally keeled.

b. Last whorl with many spiral keels. *occata*.

*b*¹. Last whorl with few spiral keels. *acutifilosa*.

*b*². Last whorl rounded, not sculptured. *rubiginosa*.

*a*². Earlier whorls convex, without spiral or longitudinal sculpture. *bulbosa*, *nigrina*, *circumlineata*.

G. plicifera Lea includes the following synonyms or slight local races: *silicula* Gld., 1847, *shastaensis* Lea, 1856, *rudens* Reeve, 1860, *bairdiana* Lea 1862. Its range extends from the southern end of Puget Sound, Washington, to Pitt and Feather Rivers, California.

G. bulbosa Gld., 1847, described from the Columbia River, and before me from the Owyhee River, includes *newberryi* Lea, 1860, from the upper Des Chutes River, both streams being tributary to the Columbia.

It is doubtful whether *G. nigrina* Lea, 1856, should be included in *bulbosa*, but it seems to me very likely. *G. nigrina* includes *draytonii* Lea, 1862, and *Melania californica* Clessin, Malak. Blätter (n. F.) v, p. 189, pl. 4, f. 9, 9 (1882), as synonyms, and *G. circumlineata* Tryon is probably only a variety, distinguished by larger size and more or less malleated whorls, which show spiral flat faces like some forms of *Limnæa palustris*, or sparse low spiral carinæ. *G. nigrina*, in its several forms, is distributed over northern California from Sonoma and Napa counties north to Humboldt, and east to Lassen and Plumas counties. It is characteristic of the Sacramento, as *bulbosa* is of the Columbia, drainage.

The fossil *G. tayloriana* Gabb has the sculpture of *occata* and *acutifilosa*, and is probably an ancestral form of these species.

Fluminicola seminalis (Hinds). Small creek at Eagle Lake; head of Fall River, Southeastern Siskiyou Co.; S. Fork Pitt R., Modoc Co.

Valvata virens Tryon. Willow Creek, tributary to Susan River, Lassen Co.

Anodonta californiensis Lea. Upper waters of Willow Creek.

Margaritana margaritifera (L.). Sacramento R. at Redding.

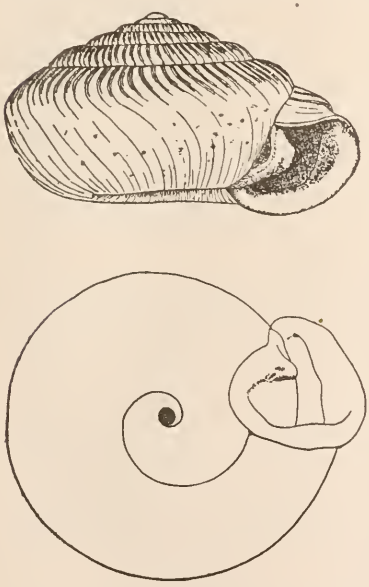
Pisidium ultramontanum Prime. Duck Lake, Lassen Co.; W. Fork Feather R. at Morgan Spr., Plumas Co. Another species of *Pisidium* occurred in Modoc and Siskiyou counties.

A NEW PLIOCENE POLYGYRA FROM FLORIDA.

BY CHAS. W. JOHNSON.

Polygyra caloosaensis, n. sp.

Whorls six, slightly depressed, crossed on the body whorl above by about 65 coarse, oblique, subarcuate costæ, that end rather abruptly at the periphery; toward the apex they become gradually smaller or obsolete, apical whorl smooth; below the periphery the costæ become obsolete and the surface has an indented or malleated appearance. Umbilicus wide, one entire whorl (beside the body whorl) being visible below. Aperture sublunate, narrowed above, lip broad, unevenly reflected, slightly thickened on the base, giving the appearance of an obsolete tooth, callus continuous over the parietal wall and bearing a prominent oblique process, that is subtruncate above, but extends narrowly toward the base. Alt. 6 mm., greatest diam. 11 mm.



Two specimens, (one immature) from the material collected by the late Dr. H. G. Griffith from the Pliocene beds of the Caloosahatchie River, Florida.

Type No. 9316 Collection of the Wagner Free Institute of Science. This species belongs to the typical *cereolus* section, but has the size and form of *P. uvulifera*. Dr. Dall records *P. cereolus microdonta* from the Caloosahatchie beds (Trans. Wagner Free Inst. iii, pt. 1, p. 19), but this species cannot be confounded with that.

VIVIPAROUS MIOCENE TURRITELLIDÆ.

BY FRANK BURNS.

I have lately made one of the most interesting discoveries that I have met with in all my work in the Southern Tertiary, and send you below the facts for publication.

I lately went to Plum Point, a classical spot in Maryland, to try to get a fair representation of the fauna there, as the beds and shells are so friable that it has been heretofore almost impossible to do so. I have a large amount of marl and many hundreds of the larger bivalves, collected to get the small things enclosed in the matrix between the valves, also in such gastropods as I could get out without breaking. In looking over some sand I came across a small fragment of *Turritella cumberlandia* Con., 21 mm. long and 11 mm. wide, and out of this I obtained over two hundred embryonic shells that were enclosed in the mother shell. Of all the great number of thousands of such shells that I have heretofore collected, I never saw anything like this, nor have I read of it.

These embryonic shells were never born, so to speak. Their mother died with them enclosed, and, as the animal decayed, the front of the aperture was closed with fine silt, leaving the embryonic shells intact, where they have remained for an immense period of time, as this is the lowest fossiliferous bed in the Miocene. These embryonic shells are about one millimetre in length and about as wide. I have heretofore collected very young *Turritellidæ* from fine sand where they had died, but never before saw one in the parent fossil. A fine point for investigation is whether the recent *Turritellidæ* are oviparous or viviparous. The literature that I have access to is a little hazy on the subject.

Since writing the above I have found another specimen in the same condition, but of a different species, *Turritella indenta* Con.; both from the same bed at Plum Point.

The last specimen was bored by a mollusk and, of course, died before spawning. As soon as I removed a small portion of sand the little fellows came pouring out by the hundred, so that I have duplicated the most interesting find of my life.

NEW SOUTHERN UNIOS.

BY BERLIN H. WRIGHT.

Unio unicostatus, sp. nov.

Shell thin, obovate, somewhat inflated, inequilateral. Smooth, with distant and inconspicuous growth lines; epidermis olivaceous with numerous, well separated, indistinct, broad green rays throughout the entire disk, but which are usually most distinct on the posterior half: dorsal margin short and straight, anterior margin very short and abruptly rounded, base sub-emarginate, posterior margin rounded and usually (in the male) biangulated; umbos prominent, beaks eroded, umbonal angle obsolete; posterior area with a single little rib extending from beak to the superior posterior margin; beak cavities well defined; dorsal cicatrices deep and close up under the beaks, anterior cicatrices distinct; posterior ones confluent and all smooth; lateral teeth slender, straight and prominent; cardinals lamellate, oblique and prominent; nacre pale flesh color, pink or red. Width $1\frac{7}{8}$, length 1, diameter $\frac{5}{8}$ inches.

Habitat: Spring Creek, Decatur Co., Ga.

Type in National Museum.

Remarks: Affinity, *U. lienosus.* A large lot of these shells has been in hand for two years—and some have been distributed to contributors to the collecting fund under the name of *U. nigrinus* Lea, and *U. lienosus* Con. var. Its outline is much more obovate than either species and it is smaller and thinner than the latter. The female shells of *unicostatus* show a still further departure from both of the above-named species in developing a far greater degree of expansion on the base. The little rib on the posterior area is also a distinguishing feature, though it is sometimes nearly obsolete. Its epidermis is never black like that of *U. nigrinus.*

GENERAL NOTES.

Land Shells of Berks Co., Pennsylvania.—During August of the present year I spent some days in Amity township, Berks Co., Pa. Only a few hours were given to collecting, the following species being obtained:

Polygyra albolabris (Say), *P. tridentata* (Say), *P. hirsuta* (Say).
Vallonia pulchella (Müll).
Bifidaria armifera (Say).
Pyramidula striatella catskillensis (Pils.).
Helicodiscus lineatus (Say).
Zonitoides arboreus (Say).
Gastrodonta suppressa (Say).
Vitrea rhoadsi Pils., *V. indentata* (Say).
Agriolimax campestris (Binn.).

This extends the range of *Pyramidula striatella catskillensis*, not hitherto found in Pennsylvania, and adds another locality for *Vitrea rhoadsi*. The other species are of course common and widely distributed.—*H. A. Pilsbry.*

Physa cubensis in Florida.—The small, slender, glossy *Physa* of peninsular Florida often goes under the name *P. pomilia* Conr., in collections. Recognizing that this was incorrect, I gave the MS. name "*P. heterostropha peninsulæ*" to the specimens collected at Miami by Mr. S. N. Rhoads (this journal, p. 48). On comparing with Antillean forms I find that the species is *Physa cubensis* Pfr., described from western Cuba.—*H. A. Pilsbry.*

Shells Collected at Oakdale, Morgan Co., Tenn.—During a few hours stay, the following species were collected on the bluffs along the Emory River.

Polygyra stenotrema Fér.
Polygyra exoleta Binn. 2 dead and poor.
Polygyra wetherbyi Bld. 4 alive and poor.
Polygyra tridentata Say *Var.* 4 alive, one dead.
Polygyra appressa sculptior Chad. Saw many dead ones.
Polygyra appressa perigrapta Pils. 1 alive—saw a few dead.
Omphalina laevigata Pfr. 1 young alive—several dead.
Gastrodonta interna Say.

Am sending you one of the *tridentata*. You will note the teeth are

like var. *complanata* but the sculpture is like *tridentata*. My largest shell, the dead one, is 20½ mm. diam. I thought at first they were *complanata* but on comparing with typical shells from Burnside, Ky., collected by Sargent, I saw the difference.—*Geo. H. Clapp.*

PUBLICATIONS RECEIVED.

NOTES ON THE MOLLUSCA OF THE ARABIAN SEA, PERSIAN GULF, AND GULF OF OMAN, mostly dredged by Mr. B. W. Townsend, with descriptions of twenty-seven species by Jas. Cosmo Melvill. Ann. and Mag. of Nat. Hist. ser. 7, Vol. iv. pp. 81–01 pls. i, ii, Aug. 1899.

REPORT ON THE MARINE MOLLUSCA OBTAINED DURING THE FIRST EXPEDITION OF PROF. A. C. HADDON TO THE TORRES STRAITS in 1888–89. By Jas. Cosmo Melvill, and Robt. Standen. Linn. Soc. Journ. Zoöl, Vol. xxvii, pp. 150–206, pls. 10, 11, 1899.

Review of the work done in that region with a list of the collecting stations of Prof. Haddon is followed by a catalogue of the species. 449 species are recorded, including 24 that are new. One new genus of Neritidæ, *Magadis*, and a new subgenus of *Pholadomya* Sowb., *Parilimya*, are described. The paper closes with some very interesting remarks on the few recent species of *Pholadomya*.—*C. W. J.*

WEST AMERICAN EULIMIDÆ, By Edw. G. Vanatta. Proc. Acad. Nat. Sci. 1899, pp. 254–257, pl. xi. Three new species are described and *Enlima compacta* Cpr., *E. micans* "Cpr." Reeve, and *E. rutilis* Cpr. are redescribed and figured.

PROCEEDINGS OF THE MALACOLOGICAL SOCIETY OF LONDON. Vol. III, no. 5, July, 1899. Lieut-Col. H. H. Godwin-Austen delivlivered the Presidential Address on February 10 on the subject of Indian malacology, a field which he has made peculiarly his own. The address begins with an interesting sketch of the workers on Indian mollusks, and continues with a review of the progress and present state of our knowledge of the most prominent and characteristic forms of the mollusk life of India. Particularly interesting are the paragraphs upon *Camptoceras* and the *Zonitidæ*. The development of the latter group in India is enormous in number of genera and species, and remarkable in the series of forms leading to slug-like genera such as *Girasia*. And as it is to Godwin-Austen himself that

we owe a knowledge of the anatomy of these forms, his ideas of the succession and relationships of the genera will naturally carry great weight. Godwin-Austen is emphatic in opinion that the slug-like genera trace their ancestry to forms with well-developed shells, *Macrochlamys* standing in an ancestral relation to *Austenia* and *Girasia*. This goes to confirm the doctrine that naked forms are never primitive pulmonates. The address will well repay careful reading by those interested in land snails.

Messrs Wm. Moss and W. M. Webb give the results of the dissection of *Trachycystis*, *Dorcasia* and *Isomeria*. In *Dorcasia globulus* the genital system was found to be simple, as in *Polygyra*, but the vas deferens is bound to the penis distally. *Isomeria subcastanea* is the first species of its subgenus to be dissected, and the anatomy proves it to have been rightly located in the genus *Plurodonte*. It has a special feature in having the penis retractor muscle inserted on the epiphallus, as in the allied Oriental forms. "The male organs in particular resemble those of *Chlorites porteri* more nearly than they do *Pleurodonte*."

In his notes on the non-marine molluscan fauna of the Hawaiian Is., Mr. Ancey gives descriptions, notes and figures of numerous little-known and new forms; a new genus, *Thaanumia*, is proposed. In a succeeding paper, Mr. Sykes figures numerous hitherto unfigured Hawaiian land shells described by Ancey and Gulick. This is a most valuable and welcome contribution.

A new *Dinoplax*, *D. fossus*, is described by Mr. E. R. Sykes. Like the type of the genus, it is from South Africa.

Mr. Smith describes a large snail from Perak as *Hemiplecta floweri*.

Mrs. Agnes Kenyon gives the history of the seven specimens of *Voluta Roadnightæ* at present known, all being from various localities on the coast of Victoria. The largest measures 8 inches in length.

The number closes with an article by Mr. H. Suter, describing six new forms of New Zealand land shells. The soft anatomy of several is figured, and in *Flammulina* (*Pyrrha*) *virescens* a peculiar flat appendiculum, inserted opposite the entrance of the spermatheca, was found. This is a new structure for the *Endodontidæ*, and the examination of allied species will be looked for with interest.

The Nautilus.

Vol. XIII. NOVEMBER, 1899. No. 7.

DONAX STULTORUM, MAWE—CONRAD'S SPECIES, CYTHEREA CRASSATELLOIDES.

BY ROBT. E. C. STEARNS.

On delving into the literature and resurrecting the little known work of some good old forgotten author, in pursuance of the law of priority, we have to rehabilitate an overlooked name at the expense of a better and more appropriate one, that has been in use for nearly two-thirds of a century. Of course this results in some confusion, and the revision of labels, catalogues, etc., which is no trifling affair. An instance of this kind is seen in the case of the well-known *Cytherea* (*Tivela*) *crassatelloides* of Conrad (1837), of Californian waters, which now, though the specific name is highly appropriate, is found to conflict with that of *stultorum* of Mawe, who figured it in 1823, from a young example, assigning it to the genus *Donax*. The late Dr. Philip Carpenter, who was inclined to be conservative in cases of this kind, while mentioning Mawe's species in the British Association Report, 1863, p. 524, and in the tabulated list of the shells of the Vancouver and Californian province, same volume (p. 640), adheres to Conrad's name and says, "jun. = *stultorum* Gray." With over a hundred juniors before me, measuring from three-fourths to an inch and a half (19 to 37 mm.) in length, it seems strange that this form, even in its adolescent stages, should have been regarded as a *Donax*. On page 526, of his report as above, Carpenter says "[the young of this Pachydesma is 'Trigona stult-

orum Gray,' Desh., MS., in British Museum.]" The earlier synonymy may be arranged thus:[1]

1823. *Donax stultorum* Mawe. The Linn. Syst. Conch., pp. 37, 40, pl. 9, f. 7 (no description; locality "Indian Seas").

1828. *Donax stultorum* Mawe, Gray. Index Testaceologicus, Suppl., pl. 2, *Donax*, f. 2. Also Hanley's edit., 1856 (no description).

1837. *Cytherea* (*Trigonella*) *crassatelloides* Conrad. Journ. Acad. Nat. Sci., Phila., vii. pt. 2, p. 253, pl. xix, fig. 17.

1838. *Trigona stultorum* Gray. The Analyst, viii, p. 304 (no description; refers to "*Venus stultorum* Gray, Wood, Suppl., t. 2, f. 2." This is a false reference for *Donax stultorum*, loc. cit.).

1843. *Cytherea crassatelloides* Con., Hanley. Descript. Catal. Rec. Biv. Shells, p. 106.

1843. *Cytherea stultorum* Gray, Hanley. Descript. Catal. Rec. Biv. Shells, p. 106. (First *description of stultorum*.)

1844. *Cytherea* (*Trigonella*) *crassatelloides* Con., Hinds. Zoöl. Voy. H. M. S. "Sulphur," Moll., p. 65, pl. 21, f. 1.

1849. *Trigonella crassatelloides* Conrad, Journ. A. N. S., Phila., i, pt. 3, p. 213.

18— (?). *Cytherœa crassatelloides* Con., Sowerby. Thes. Conch., ii, p. 612, pl. 127, f. 1–3. (*C. stultorum* placed in synonymy as the young.)

1853. *Trigona crassatelloides* Con., Desh., Catal. Conchif. Coll. B. M., pt. 1, p. 46.

1853. *Trigona stultorum* Gray, Deshayes. Catal. Conchif. Coll. B. M. pt. 1, p. 46.

1864. *Cytherea crassatelloides* Con., Reeve, Conch. Icon. Vol. xiv, pl. 1, f. 3.

1898. *Cytherea* (*Tivela*) *crassatelloides* Conrad. Stearns in Proc. U. S. Nat. Museum, vol. xxi, pp. 371–378, plates xxiii–xxv.

Conrad never actually used the combination "Pachydesma crassatelloides," though it is implied in his brief note of 1854.

This species exhibits many varietal aspects, as is shown in the paper last referred to.

The generic synonymy is as follows:

Trigonella Conrad, 1837. Journ. A. N. S., Phila., vii, pt. 2, p.

[1] Dr. Pilsbry has kindly assisted me in compiling the literary history of this species.

253 (proposed as a subgenus of *Cytherea;* type and sole species *Cytherea crassatelloides* Conr.).

Trigonella Conrad, 1849. Journ. A. N. S., Phila., I, 213 (diagnosis of genus).

Pachydesma Conrad, 1854. Proc. Acad. N. S., Phila., vii, p. 31 ("note on the genus *Trigonella* Con. This name being superseded, I propose to substitute that of *Pachydesma*").

Prior to 1843 *no description* of *Donax stultorum* was published—*not a line* except the name and the locality, "Indian Seas." The specimen figured by Mawe is young, and apparently the color-var. *triserialis.*

The first *description* was by Hanley in 1843. Gray merely refers to the plate in Index Testac. Suppl., not even to Mawe's earlier publication.

Query: Should Mawe's figure, which is quite recognizable, but without description and with a false locality and erroneous generic reference, displace Conrad's name, which was from a known locality, was well defined, and was accompanied by a good figure of the typical many-rayed shell?

NEW SOUTHERN UNIOS.

BY BERLIN H. WRIGHT.

Unio singularis, sp. nov.

Shell uniformly and moderately solid, wide, rather inflated and very inequilateral. Surface sulcate, with distant growth lines; epidermis dark olive, rayless, finely wrinkled, and towards the base becoming fuscous; dorsal margin slightly arched, anterior margin abruptly rounded, base straight or subemarginate, posterior margin bluntly rounded or biangulated; beaks not prominent, and surrounded by five or six sharp concentric ridges which gradually merge into the sulcations on the umbos; umbonal ridge bluntly rounded; lateral teeth erect, solid, straight, widely separated from the cardinals and, in the left valve, from each other, single in the right and double (?) in the left valve, the superior division possessing scarcely prominence enough to warrant calling it a tooth; cardinal teeth solid, double in the left and single in the right valves; the single one being deeply serrated on its summit; beak cavities very slight;

anterior cicatrices smooth, well-impressed and distant; posterior cicatrices slightly impressed, smooth and confluent; nacre pale blue, white or coppery. Width, $2\frac{5}{8}$; length, $1\frac{3}{8}$; diameter, $\frac{9}{16}$ inches.

Habitat: Spring Creek, Decatur Co., Ga.

Type lot in National Museum.

Remarks: Affinity, *Unio scammatus* Morel. The roughness of the surface of this singular shell is the one feature that at once arrests attention. We know of no other U. S. species of this class (as to outline) that possesses such a surface. It is not, however, so conspicuously furrowed as its affinity.

AN ATTEMPT TO DEFINE THE NATURAL GROUPS OF STROMBS.

BY GEO. HALCOTT CHADWICK.

Having recently had the privilege of studying a fine series of the living species of *Strombus*, *Pterocera* and *Terebellum*, the opportunity seemed favorable for a critical examination of the entire group. As I am not aware that any similar attempt has been made to revise the Strombi, the results obtained are respectfully submitted to the scientific world. Lacking anatomical data, I have freely used neglected and sometimes indefinable features of the shells as guides to their inter-relationships. Forced to recognize some new groups, I have left the secondary matter of names to those more skilled in nomenclature, but have indicated the probable application of the titles already in use, as to the types of which scarcely any two authors, save Tryon and Fischer, agree.

Of the species and varieties of *Strombus* recognized in Tryon's monograph, I have seen all but *S. integer*, *taurus*, *listeri*, *dilatatus*, *labiosus*, *deformis*, *septimus*, *minimus*, *sibbaldi*, *erythrinus* (true), *pulchellus*, *hellii*, *scalariformis* and *bulbulus*, although *S. goliath*, *fusiformis* and *terebellatus* were not now before me. All ten of the Pteroceræ were at hand.

The grouping of the species which seems to me most in accordance with their natural relations, as indicated by shell features and geographical distribution, is as follows:

Group A (*Monodactylus*).

Canal lengthened, bent abruptly dorsally; lip with margin straightened, incurled, truncated at both ends, bearing a *posterior digitation*

originating *above* the shoulder angle; body regularly sculptured with spiral striæ and rows of nodules; spire elegant, high, *without varices;* suture suddenly, *vertically* ascending at aperture; columellar callus thinning rapidly, or with an impressed area, posteriorly; no conspicuous periostracum.

S. auris-dianæ, melanostomus, aratrum, australis.

Distribution: Mauritius to Japan and Polynesia.

The American forms and *tricornis*, included by Tryon, differ considerably (note the italicized passages above) from this very natural little Indo-Pacific group, and are grouped elsewhere.

GROUP B (*nov.*).

Canal *bent back*, the columellar *callus terminating below in a prominent knob*, giving a bilobed appearance; lip with the antesinual lobe *directed forward*, the outer margin inrolled and thickened, *descending* from the suture and lobed in the posterior sinus; body with *spiral rows of squarish nodules;* spire moderate.

S. papilio, lentiginosus.

Distr.: Zanzibar to Polynesia.

The wide difference between these two species and the smooth ones allied to *laciniatus* is readily seen from the above definition, while many points of resemblance with Group A will be detected, suggesting community of origin.

Sub-group B 2.

Callus prominent below, hardly knobbed; lip edge sharp, "*hooded*" posteriorly, but not lobed; spire *high*, nodular.

S. granulatus.

Panama and Galapagos.

This species, which differs utterly from all other American forms, agrees too closely in many respects with the *lentiginosus* group, and seems to form a geographically isolated section.

GROUP C (*Strombus*).

Shell large and strong; canal not much lengthened, somewhat curved or *sinuous;* lip *widely expanded*, especially above, where it is sometimes lobed; suture ascending at aperture; body spirally corded; periostracum thick and coarse, *spirally wave-striolate.*

S. gallus, gigas, goliath, costatus, integer, bituberculatus, bubonius, galeatus, peruvianus.

Distr.; American, South Carolina to Brazil, Mazatlan to Peru; West African.

I can find no reliable feature by which to separate the American "monodactyl" species (the posterior lobe, which is derived *from* the shoulder-angle and is not homologous with the digitation of the Oriental forms, being incipient in gigas itself), and I have detected the peculiar periostracum in all but *gallus*. Moreover in the characters of spire and body *gallus* agrees with *gigas*, *bituberculatus* with *costatus* (and has a variety corresponding with *inermis*), and *peruvianus* with *galeatus*, and this accords with their geographical range.

Sub-group C2.

Canal short, *straight;* lip *scarcely expanded*, with margin faintly incurled, *deeply receding* at the suture, and not surmounting the shoulder of the penultimate whorl; body nearly smooth; periostracum finely, densely, vertically lamellose; inner lip spreading.

S. pugilis, *gracilior*.

Antillean and West Mexican.

The last clause of the definition is needed to distinguish this small American group from *Conomurex luhuanus*, which it strangely parallels. Only a conservative spirit and the occasional presence of wave-striolations on the periostracum induce me to give this group secondary rank under group C.

GROUP D (*Euprotomus*).

Canal very short, with the *dorsal margin produced beyond the short tip* of the straightened columella; lip with the antesinual lobe broad, *rolled upward and inward*, the outer margin broadly and *abruptly inflected;* body with a large node; spire high, whorls nodulous.

S. laciniatus, *latissimus*, *ponderosus*, *taurus*.

Distr.; Japan to Fiji Is.

S. tricornis. Red Sea.

The last species is aberrant in its single posterior lobe and obsolescent inflection of the lip margin, but the resemblance to *peruvianus* is evidently deceptive. *S. taurus* strikingly emphasizes the close alliance of this group to

GROUP E (*Pterocera*).

This group need not be redefined. It has the peculiar form of antesinual lobe of the preceding group, and differs mainly in the elongated canals and numerous lip-claws.

(*To be continued.*)

NOTE ON SOME NEW MEXICAN SHELLS.

BY H. A. PILSBRY.

Professor T. D. A. Cockerell recently sent a small box of fluviatile debris containing shells, obtained during the past summer by Professor J. D. Tinsley at South Spring Creek, near Roswell, N. M. The list of species follows:

Polygyra texasiana (Moric.)
Bifidaria pentodon (Say).
Zonitoides minusculus (Binn.).
Carychium exiguum (Say).
Limnæa humilis Say.
Planorbis bicarinatus Say.
Planorbis exacutus Say.
Ancylus rivularis Say.
Physa virgata Gld.
Paludestrina seemani (Ffld.).
Amnicola sp.
Pisidium compressum Prime.

There was a single dead specimen of the *Amnicola*, which is probably a new species somewhat like *A. micrococcus*, but more conic. With the shells were numerous minute bivalve crustaceans of the *Cypris* type, and some of the Valvata-like larva-cases of *Helicopsyche*, composed of much coarser materials than are chosen by our eastern *H. arenifera*.

AMONG THE UNIOS OF THE SABINE RIVER.

BY L. S. FRIERSON.

The Sabine River forms part of the boundary between Texas and Louisiana. The Houston, East & West Texas Railroad crosses the river at Logansport, a thriving village of about one-half mile in diameter. This town derives its support from an immense saw-mill, one of the largest in the world. It is worthy of a trip to see the huge logs pulled about, and in a few minutes turned into finished lumber, loaded into cars and ready to go unto the uttermost parts of the world.

But it was not lumber for which I took my trip to the Sabine, but to describe the river and its inhabitants. This river flows through and over immense sand banks. Its walls are fifty feet high, and mainly of pure sand from top to bottom.

At the time of my visit it was so low that even a flat-bottomed skiff could not be paddled up it, except here and there in pools. As

soon as we were out of sight of the town we waded into the river. In the clear water the Unios could be seen and picked up, and in a couple of hours we had collected about 1,000 and returned to the town, and shipped our catch home. By this time the August sun was at a heat of about 92°, and we spent the rest of the day trying to keep cool. By the next train we came home, and cleaned up and assorted our booty. They were a rich lot. You lovers of Unio, read the list:

Unio multiplicatus Lea.

Unio trapezoides Lea.

Unio perplicatus Con. with several "*aliases.*"

Unio purpuratus Lam., very numerous and large.

Unio anodontoides Lea., rather scarce, and *very poor.*

Unio cornutus Barnes. Fine.

Unio sphaericus Lea.

Unio refulgens Lea.

Unio hydianus Lea.

Unio castaneus Lea.

Unio gracilis Bar., very abundant.

Unio nigerrimus Lea. A very distinct species, and *most certainly not* subrostratus Say, as has been claimed.

Unio cerinus Conrad, scarce.

Unio askewii Marsh, abundant.

Unio chunii Lea, scarce.

Unio riddellii Lea. This shell is so rare that Mr. Chas. T. Simpson writes me that these from the Sabine river are the only undoubted specimens he has ever seen (excepting the type).

Unio asper Lea.

Unio elegans Lea.

Unio satur Lea. Another "rara avis." (Some uniologists think this shell to be a variant of *U. occidens*, but, from the study of 105 specimens, I believe it a "*good*" species.)

Unio amphichænus Frierson. This is a remarkable shell, and its novelty has now "stood fire" without loss.

Anodonta imbecillis Say.

Anodonta edentula Say. (From a tributary of the Sabine river, and by odds the largest specimen I have ever seen.)

Anodonta virens-stewartiana, etc., etc.

Margaritana confragosa Barnes.

Besides these, there are a lot of "suspects" also, which may yield the following species:

Unio cuneus Con.

Unio hebetatus Con.

Unio ——. New species; has pink nacre.

Finally, our box yielded two large univalves, which Mr. Marsh pronounces to be *Campeloma geniculum* Conrad.

ABALONE FISHERY IN CALIFORNIA—PROTECTIVE REGULATION.

BY R. E. C. STEARNS.

The continued gathering or "fishing" of Abalones (*Haliotis*, Earthells or Ormers, as they are variously called), along the coast of California, has recently led to restrictive action by some of the county authorities. The supervisors of Monterey, and of other of the seaboard counties, have taken the necessary legal steps to regulate the fishing, which has been carried on continuously from about 1864 to the present time by the Chinese, and of late by the Japanese. The well-known species, *Haliotis rufescens* and *H. cracherodii*, so abundant between tidemarks a few years ago, have, owing to the uninterrmittent collecting by the Asiatic fishermen, become comparatively scarce.

An ordinance recently passed by the authorities of Monterey County, makes it unlawful to "fish" for Abalones except in deep water, and by means of diving apparatus or other deep-sea devices. A license of $60 is also to be charged in the future for "fishing" for abalones. (This license fee is presumably for the term of a year.) The ordinance is said to be "the result of a fight" between the city of Monterey, seeking to stop the gathering and shipping out of the county (or country?) of Abalone meats and shells, and the Japanese cannery, that has carried on an extensive business at a plant on Carmel Bay, about six miles south of Monterey. Practically, the ordinance is a compromise between local parties; the fishermen being restricted to "deep water," excepting a limited portion of the littoral

zone, between a line drawn due west from Carmel river and the southern boundary of the county.

Monterey City, with its Del Monte hotel and fine surroundings, Pacific Grove with its many attractive features, the beautiful Carmel Valley and the old Mission church, make the region hereabout the most popular seaside resort in Central California, and draw great numbers of people from all parts of the state. The rambles along the shore, collecting the beautiful Abalones and other shells, by visitors, who carry them away as souvenirs, has been one of the many attractions, and has had no doubt something to do with the above action on the part of the authorities, to prevent the extermination of one of Nature's most beautiful forms. Whatever may have been the motive that has led to this restrictive regulation, it is amply justified on the broad ground of public interest, and the example of the Monterey supervisors should be followed by the officials in all of the coast counties. R. E. C. S.

CORRESPONDENCE.

Honolulu, Hawaiian Ids., Sept. 16, 1899.

* * * My trip to Alaska was most interesting and successful. My attention was chiefly given to geology and paleontology, so I had little time for collecting shells, still I did something and added a few points to our knowledge of geographical distribution. The most interesting was the discovery at Biorka Island, at the entrance of Sitka sound, that a number of the southern species creep up along the seaward margin of the archipelago much further north than they do among the islands. Thus I found *Leptothyra carpenteri*, *Psammobia californica*, *Calliostoma filosum*, etc., at Biorka, though they do not occur in Sitka Sound nor, as far as I know, much north of Vancouver Island, in the inner channels. Prof. Ritter, of Cala. State University, did the dredging that was done, but the results in mollusks were less novel than in other directions.

After our return to Portland I came down here Aug. 9th per steamer, making the passage in six days very comfortably. The sea en route was much less supplied than I had expected with pteropods

and other pelagic life, and there was hardly a trace of phosphorescence, a great contrast to the northern seas, which fairly reek with life in a myriad forms. We saw Velella and flying fish (once) and a few porpoises, one petrel, and away from land were attended as usual by the black-footed albatross.

Here I have been revising the catalogue of the shell collection of the Bishop Memorial Museum, a surprisingly well developed and outfitted museum of Polynesian ethnology and natural history. After Mr. Bishop, formerly of Honolulu, a wealthy banker who founded the museum in memory of his wife (who belonged to the royal family of Hawaii), the existence and flourishing condition of the museum is largely due to Dr. W. T. Brigham, the director, who has been a resident here for many years.

The shell collection is that made by Andrew Garrett, and (apart from the great collections like those of the Nat. Museum at Washington, the Academy at Philadelphia, the British Museum, etc.) is one of the best in Pacific Ocean species that exist. There are 8,000 or 9,000 species and about 22,000 specimens, mostly in excellent condition, neatly mounted on tablets with printed labels. Local collecting is poor. The land shells are found in the wet region high up on the mountains and not near the town, where irrigation alone enables anything to grow. There is little on the reefs near the town; I noticed a *Tectarius* and a *Melaraphe*. *Plecotrema striata* Phil. was the only thing at all common. The animal is much like that of *Alexia;* there is no transverse sulcus to the sole of the foot and the eyes are directly over the middle line of the tentacles at their bases.

There are one or two species of *Melania* here, very similar to the Oregonian species as regards the shells, but these are true Melanians with a fringe on the mantle edge. The muzzle is rather long, flat and tapering, the mouth is a vertical slit; the colors gray, dotted with opaque yellow and white. A singular fact appeared on trying to drown some for dissection; although there were no eggs on the shells, there appeared a lot of young Melanians with about six smooth, glassy nepionic, and one subsequent sculptured, whorls. There seems to be no escape from the deduction that these species are viviparous. The grown shells are always decollate. I shall try and bring some home. The live Achatinellas and Auriculellas look like other pulmonates (Helicidæ). * * *

Wm. H. Dall.

GENERAL NOTES.

Polygyra triodontoides in New Mexico.—Prof. J. D. Tinsley has just brought me several specimens of *P. tridontoides* Bland, which he collected this year on South Spring Creek, near Roswell, in the Pecos Valley. This adds a species to the fauna of New Mexica, and extends its range considerably to the west.—T. D. A. Cockerell.

PUBLICATIONS RECEIVED.

The Mollusca of Funafuti. By Chas. Hedley. (Memoirs of Australian Museum, III., 1899.)

Several expeditions have recently been made to the Ellice Islands, in which is situated the Funafuti Atoll. In his introductory remarks Mr. Hedley says: "The poverty of the fauna of the atoll, compared with that of any continental area lying under corresponding latitudes, such as Queensland, New Guinea, or the Melanesian Plateau, again asserts itself. Whole groups, the Brachiopoda and the Polyplacophora, are missing, giving to the fauna an unsymmetrical aspect. Especially significant is the absence of mollusca with large eggs, such as *Nautilus*, *Melo* or *Voluta*, from this drifted fauna. In many cases the Funafuti shells are smaller than the usual stature of their respective species."

"It comes as a surprise to a naturalist to find the pelagic fauna scarce in this latitude. One Pteropod, one Heteropod, and a fragment of *Ianthina* were all of this class that came under my notice. The quiet waters of the lagoon prove a richer field for a collector than the storm-swept ledges of the ocean beach. The sole representative of a fluviatile fauna was a species of *Melania*, which occurred in some abundance in the native wells."

Part I. contains the Gasteropoda, Part II., the Pelecypoda and Brachiopoda, followed by a summary of the entire fauna, and later by a supplement.

Four new genera, *Obtortio*, *Contumax*, *Thetidos* and *Mecoliotia*, 53 new species and four new varieties of Gasteropoda; 6 new Pelecypoda, one new Scaphopoda, and one new Brachiopoda are described. Upwards of 650 species are recorded from the atoll.

The Nautilus.

Vol. XIII. DECEMBER, 1899. No. 8.

NOTE ON SIGARETUS OLDROYDII.

BY W. H. DALL.

Nearly two years ago (Nautilus, December, 1897, p. 86), I described, from a single specimen obtained in deep water at San Pedro by Mrs. Oldroyd, an interesting shell belonging to the Naticidæ. Although of rather naticoid shape, it showed a well-marked fine spiral striation and a flaring umbilicus, recalling *S. concavus* Lamarck, but with a much thinner and more delicate shell and larger umbilicus. Recently Mr. J. S. Arnheim, of San Francisco, dredged in Drake's Bay, Cal., a larger shell which proves to be the adult form of *S. oldroydii*. In this the Naticoid form has become more pronounced, the umbilicus smaller and narrower, and a basal zone of paler color than the rest is well marked. The shell continues to be very thin, the soft parts in life cover it almost entirely, though the thin extension of the mantle over the shell contracts greatly when the creature is placed in alcohol. The soft parts and operculum are typically Sigaretoid, but the shell when adult might almost be taken for a *Lunatia*. The dimensions of the adult are alt. 50, max. diam. 55 mm. It is almost exactly intermediate, as far as the shell goes, between *Sigaretus*, *Eunaticina* and *Lunatia*.

MODIOLA PLICATULA LAMARCK IN SAN FRANCISCO BAY.

BY ROBERT E. C. STEARNS.

The cry is, "Still they come." In my short note in the February number of THE NAUTILUS, I suggested the probability that *Mytilus hamatus* Say, would sooner or later be detected in the San Francisco Bay region. Though not as yet reported, its near relative, *Modiola plicatula*, is there sure enough, and has been for several years.

Through the kindness of Dr. J. P. Smith, of the Leland Stanford, Jr., University, I have received an example nearly two inches long, collected on the eastern shore of the bay by Mr. N. F. Drake, in 1894, at a point "3 miles north of Stanford University." I am further indebted to Dr. Smith for specimens of *Urosalpinx cinereus*, from the oyster beds near Redwood city; these were collected by Mr. E. E. Smith in 1898.

Some time ago, Mr. Hemphill sent me several examples of *Gemma purpurea* Lea.; these were compared by Mr. Dall with specimens in the National Museum; he wrote to me, saying, they "were about midway between the typical southern form and the large flat northern var. *Totteni* Stm." The shells were all dead, and might have been brought in mud with the seed oysters, at the time the latter were planted on the Alameda flats.

Los Angeles, Cal., October, 1899.

NOTE ON THE CLAUSILIÆ OF CELEBES.

BY E. R. SYKES.

In their very valuable work[1] on the land-shells of this island, Herr P. & F. Sarasin describe (p. 218) two new species of this genus —*C. bouthainensis* and *C. menahassæ*—and list the forms known hitherto. Unfortunately, a little note by the present writer,[2] in which the species were listed, two new forms described, and the name of *C. balantensis* proposed for *C. celebensis*, Bttg. non Smith, appears

[1] Wiesbaden, Oct., 1899, 4to.

[2] J. Malac. vi, pp. 23–4, pl. iv, *pars* (Aug. 1897).

to have escaped their notice. Judging from their descriptions and figures, *C. bouthaineusis* appears to be a synonym of *C. pyrrha* Sykes, and *C. minahassæ* is very close to *C. makassarensis;* indeed these last two may be identical, but their figures indicate a shell in which the whorls increase at a more even rate. In both cases the plicæ palatales seem to be similar in number, size and position.

Further, they place *C. celebensis* Bttg. (*non* Smith) as a variety of *C. moluccensis,* following Dr. Bœttger,[1] who has also proposed *Paraphædusa* as a new section for *C. subpolita* Smith.

If these conclusions be correct, then the Celebes list will stand as below:

C. alternata Moellendorff.
C. celebensis Smith.
C. cumingiana Pfr.
Var. *moluccensis* Mts.
celebensis Bttg. non Smith.
balantensis Sykes.
Var. *simillima* Smith.
C. makassarensis Sykes.
C. minahassæ Sarasin.
C. pyrrha Sykes.
bouthainensis Sarasin.
C. subpolita Smith.
C. usitata Smith.

I feel some doubt as to whether *C. simillima* be not a good species, distinct from *C. cumingiana.*

NOTES ON THE MOLLUSCA OF CANANDAIGUA LAKE REGION, N. Y.

BY DR. CHAS. T. MITCHELL.

During the past summer I have collected, mounted and placed in my collection in the Union Free School Building in this village the shells of the following species of mollusca found in the above mentioned region, which consists of the Lake, its inlet and outlet, and its shores, and glens opening toward the lake; most of the species are plentiful, while a few are rare:

[1] Nachrbl. deutsch. malak. Ges. 1899 (April), pp. 56–9.

1. *Uuio complanatus* Sol. Outlet.
2. *Lampsilis luteolus* Lam. Lake.
3. *Lampsilis iris* Lea. Outlet.
4. *Alasmodonta rugosa* Barnes. Outlet and Lake.
5. *Alasmodonta pressa* Lea. Outlet, rare.
6. *Alasmodonta marginata.* Say. Outlet.
7. *Anodonta grandis* Say. Outlet.
8. *Anodonta excurvata* De Kay. Inlet.
9. *Anodonta fragilis* Lam. Inlet.
10. *Anodonta implicata* Say. Lake.
11. *Anodonta footiana* Lea. Outlet, rare.
12. *Anodonta salmonia* Lea. Outlet.
13. *Anodonta simpsoniana* Lea. Lake, rare.
14. *Anodonta lewisii* Lea. Lake.
15. *Anodontoides subcylindraceus* Lea. Outlet, rare.
16. *Anodontoides ferrussacianus* Lea. Outlet, rare.
17. *Sphærium striatinum* Lam. Lake.
18. *Sphærium rhomboideum* Say. Lake.
19. *Sphærium simile* Say. Lake.
20. *Polygyra albolabris* Say. Glens.

20*a*. *Polygyra albolabris* var. *deutata* Walk. Glens, rare.

21. *Polygyra thyroides* Say. Glens.
22. *Polygyra sayii* Binn. Glens.
23. *Polygyra palliata* Say. Glens.
24. *Polygyra appressa* Say. Glens, rare.
25. *Polygyra fallax* Say. Glens, rare.
26. *Polygyra tridentata* Say. Glens.
27. *Polygyra monodon* Rack. Glens, rare.
28. *Polygyra hirsuta* Say. Glens, rare.
29. *Pyramidula alternata* Say. Glens.
30. *Omphalina fuliginosa* Griff. Glens.
31. *Omphalina inornata* Say. Glens.
32. *Circinaria concava* Say. Glens.
33. *Succinea obliqua* Say. Glens.
34. *Cochlicopa lubrica* Müll. Shores.
35. *Vallonia pulchella* Müll. Shores.
36. *Limnæa stagnalis* Linn. Lake.
37. *Limnæa emarginata* Say. Lake.
38. *Limnæa palustris* Müll. Lake, rare.

39. *Limnæa ampla* Migh. Lake.
40. *Limnæa catascopium* Say. Lake.
41. *Physa ancillaria* Say. Lake.
42. *Physa sayii* Tapp. Lake.
43. *Physa heterostropha* Say. Lake.
44. *Planorbis campanulatus* Say. Lake.
45. *Planorbis trivolvis* Say. Lake.
46. *Planorbis bicarinatus* Say. Lake.
47. *Campeloma integer* Say. Lake.

NEW SOUTHERN UNIOS.

BY BERLIN H. WRIGHT.

Unio conjugans, sp. nov.

Shell thick, solid, inflated, inequilateral, quadrate; dorsal margin arched, posterior margin truncate and subemarginate, basal margin emarginate, anterior margin uniformly rounded; umbos rounded, umbonal ridge prominent, with a marked depression in front; epidermis dark chestnut; tuberculate throughout, the tuberculations being without apparent order of arrangement or uniformity of shape, except that they expand downward and each base terminates at a growth-line, and near the base of the shell they become joined into two broken ridges on the anterior half of the shell; cardinal teeth very heavy and deeply serrated, those in the left valve being tripartite and those in the right valve double; lateral teeth, which extend to the abrupt posterior dorsal angle, are solid, depressed, curved and comparatively smooth; anterior cicatrices deep, contracted and barely distinct; posterior cicatrices well impressed and widely separated; pallial line deeply impressed and the pallial margin much thickened in the anterior portion; dorsal cicatrices many, small, and arranged in a long oblique row under the cardinal teeth; beak cavity deep, wide and bluntly terminated; nacre dead white with large umbraceous spots. Width $3\frac{3}{4}$, length $2\frac{3}{4}$, diam. 2 inches.

Habitat: Hiawassa river, Polk Co., Tenn.

Type in National Museum.

Remarks: Affinity, *U. blandianus* Lea and *U. tuberculatus* Barnes. This species fills the gap between these species, and removes the latter from the isolated position it has heretofore held, uniting the

members of the group into a continuous chain, one end of which is *U. cylindricus* Say, *U. cylindricus* Say var. *strigillatus* Nobis, *U. tuberculatus* Barnes, *U. conjugans* Nobis, *U. blandianus* Lea, *U. asperrimus* Lea, etc., and at the other extreme *U. nodiferus* Con.

Anteriorily the shell reminds one of tuberculatus, except that it is much more inflated in that region. Posteriorly it resembles *blandianus* Lea = *rumphianus* Lea. It is wider and more inequilateral, however, than that species.

(*To be Continued.*)

PISIDIUM HANDWERKI, N. SP.

BY DR. V. STERKI.

Among a lot of Pisidia from the Lilycash Creek, Joliet, Ill., collected and sent for examination by Mr. J. H. Handwerk, in 1898, there were a few specimens of evidently a new species. Yet it needed confirmation by more materials. But all efforts of Mr. Handwerk to secure more examples were in vain until a few weeks ago, when he sent a lot of several thousand specimens from the same creek, containing *P. compressum*, *fallax*, *cruciatum*, *punctatum*, one of the *abditum* group, and a few dozen of the Pisidium under consideration, which is now confirmed as a n. sp. and named in honor of its discoverer.

Mussel small, rather rounded in outline, rather high, moderately inflated; beaks moderately large, somewhat papilliform; superior margin strongly, inferior moderately curved; posterior rounded or slightly truncated, anterior end rounded or with a slight indication of an angle; surface with dense, almost regular and sharp striae, and with a silky gloss, tops of beaks smooth and shining, slightly flattened; color of epiconch pale to yellowish horn; shell rather strong, nacre colorless or whitish, hinge stout, strongly curved, plate moderately broad, lateral teeth stout, rather high, short; cardinal teeth small, fine; the right one angular, with the posterior part somewhat thicker, inserted in a longitudinal groove on the hinge plate, formed by a sharp, tooth-like prominence along the lower edge of the plate; posterior cardinal tooth of the left valve rather long, longitudinal, nearly straight, its ends sloping; anterior oblique, quite small, or almost obsolete; ligament rather small.

Long. 2.4, alt. 2.2, diam. 1.7 mill.

Hab.: Lilycash creek, Joliet, Ill. Probably it has been overlooked in materials from other places, owing to its resemblance to immature specimens of some forms of *P. compressum* Pr. When once known it will always be recognized. It also resembles some forms of *P. pauperculum* Sterki in size and shape, but its comparatively coarse striation will distinguish it at once. *Pis. handwerki* is not a showy Pisidium, with striking features, but nevertheless a good species.

New Philadelphia, O., Nov., 1899.

ORIGIN OF THE MUTATIONS OF OSTREA.[1]

The oysters are a proverbially difficult group, owing partly to their adherent situs and partly to the fact that they have not hitherto been studied with regard to the direct influence of the environment on individual specimens. That this is very great I have convinced myself from a prolonged study of a multitude of specimens of *O. virginica* of which the provenance was known, and of many hundred specimens of our tertiary species, which usually show from the character of the scar of attachment something of the circumstances in which they grew. The conclusions to which I have been led by this study may be regarded as in part provisional, but in the main highly probable, and as furnishing a first contribution to the sort of study which is essential if we would understand the processes of nature through which these animals acquire their most conspicuous external characters. They may be regarded as especially applicable to the *Crassostrea* group.

Leaving out of account the nepionic characters, the characteristics of the adult shell may be summarized and derived as follows: The most permanent characters of the shell, and the best, if not infallible guide to specific recognition among the puzzling mutations a large series presents, are the form of the hinge-margin, the minute sculp-

[1] This interesting extract by Dr. Wm. H. Dall is taken from his review of the Tertiary *Ostreidæ* in the Transactions of the Wagner Free Institute of Science, Vol. III, Part IV, p. 675, 1898. As the original paper deals chiefly with tertiary forms, and is probably not accessible to many interested in recent oysters, we reprint it here.

ture of the superficial layer of the shell (often denuded in otherwise perfect fossils), and the sculpture of the valve-margins near the hinge and on each side of it. While not invariable in all specimens, these characters, taken together, will usually enable one to refer the individual to its proper place.

The characteristics due to situs may be partially summarized as follows: When a specimen grows in still water, it tends to assume a more rounded or broader form, like a solitary tree compared with its relatives in a crowded grove. When it grows in a tideway or strong current, the valves become narrow and elongated, usually also quite straight. Specimens which have been removed from one situs to the other will immediately alter their mode of growth, so that these facts may be taken as established. When specimens are crowded together on a reef, the elongated form is necessitated by the struggle for existence, but, instead of the shells being straight, they will be irregular, and more or less compressed laterally. When the reef is dry at low stages of the tide, the lower shell tends to become deeper, probably from the need of retaining more water during the dry period. Such oysters are the so-called "raccoon oysters," a name which they get from the visits of that animal at low water to feed upon them. The so-called "raccoon oysters" figured in Dr. C. A. White's Review of the Ostreidæ (Ann. Rep. U. S. Geol. Survey, 1883, pl. 81–2) are not the reef oysters which first acquired this name, but deep-water specimens which had grown in a place where they were subjected to current action. When an oyster grows in clean water on a pebble or shell, which raises it slightly above the bottom level, the lower valve is usually deep and more or less sharply radially ribbed, acquiring thus a strength which is not needed when the attachment is to a perfectly flat surface which acts as a shield on that side of the shell. Perhaps for the same reason oysters which lie on a muddy bottom with only part of the valves above the surface of the ooze are less commonly ribbed. When the oyster grows to a twig, vertical mangrove root or stem of a gorgonian, it manifests a tendency to spread laterally near the hinge, to turn in such a way as to bring the distal margins of the valves uppermost, and the attached valve is usually rather deep, the cavity often extending under and beyond the hinge margin; while the same species on a flattish surface will spread out in oval form with little depth and no cavity under the hinge.

The average life of the ordinary *O. virginica* when "planted" for sale is about four or five years. In prehistoric times, when the reefs were undisturbed, the favored individual might attain a much greater age; in which case the lower valve especially took on excessive thickness, and the cavity of the shell often became considerably elongated and somewhat hour-glass-shaped, as in *O. contracta* Conr., whose characters in typical specimens are distinctly senile, while younger specimens of the same species have the normal form.

In the hinge of the oyster the resilium occupies the central ridge, while the ligament covers the edge of the depressions on each side of that ridge. The form and relative position of the muscular scar of the adductor is, within certain limits, a useful character, but its depression below the general interior surface of the valve or its occasional elevation above it, as in *Plicatula*, is of no systematic value, being merely a corollary of the rate of growth from the various secreting surfaces. The habit of rapid growth, causing a vesicular character of the shell substance, is more pronounced in some species than in others, and in some specimens of a species than in others; it is rarely the case that this habit (as in *O. percrassa* Conr.) has attained a constancy entitling it to systematic significance.

AN ATTEMPT TO DEFINE THE NATURAL GROUPS OF STROMBUS.

BY GEO. HALCOTT CHADWICK.

(*Pterocera continued.*)

1. Lip armed with *closed spines*,

a. Within *smooth*, *orange*,

(*Heptadactylus.*)

Pt. aurantia, *lambis*, *bryonia*.

Distr.: Red Sea and Mauritius to Japan, Australia and Polynesia.

b. Within *wrinkled*, *violet*,

(*Millipes.*)

Pt. scorpio, *pseudoscorpio*, *millipeda*, *elongata*.

Distr.: Zanzibar and Mauritius to Japan and New Guinea.

2. Lip deeply cut into numerous *open* lobes, within *finely*, *deeply*, *regularly grooved*.

Pt. violacea. Indian O., Zanzibar.

The last species is certainly quite distinct, but the other two minor groups are of slight value, the apertural wrinkles being a dynamical feature incipient in *lambis* itself.

GROUP F (*Harpago.*)

Here the *antesinual lobe gives rise to one of the great claws*, a feature unique among living Strombs, and sundering it widely from the previous group, from which Dr. Gill long ago divorced it.

H. chiragra, rugosa.

Distr.: Zanzibar to Japan and Polynesia.

The six groups previously considered agree in the strong and heavy shells, usually of large size, with spreading callus. Those which follow are usually rather small and of lighter structure, and have the inner lip restricted or defined.

GROUP G (*Gallinula*).

Shell usually light, elegant; *antesinual lobe diminished, lip expanded medially, descending rapidly* from the suture with a broad sinuation; posterior canal narrow, *hugging the spire;* body somewhat flattened in front of the aperture, usually with four or five sagittate color bands; the early whorls with small varicose ribs at intervals.

Contents as given by Tryon, with the probable addition of *S. pulchellus*, which is unknown to me autoptically.

Distribution: Red Sea and Zanzibar to Japan and Polynesia.

S. canarium, isabella.

Red Sea to Japan and Australia.

The last two species, erroneously grouped with the American forms by Tryon, but correctly placed by Chenu and others, are aberrant in their heavier growth, obscure posterior canal and undefined inner lip. These differences, however, hardly seem to warrant the institution of a sub-group.

GROUP H (*Conomurex*).

Shell *conoid*, often distorted; lip with margin rather straight and incurled, *posterior sinus deep, anterior sinus distinct, oblique, remote* from the canal; inner lip narrow, scarcely defined; color bands sagittate.

S. luhuanus, mauritianus, fasciatus, gibberulus.

Distribution: Red Sea and Natal to Japan and Polynesia.

Forms of *fasciatus* approach closely to the variety *coniformis* of *mauritianus*, and the aperture of the former species is indifferently smooth or finely ridged. It, therefore, becomes necessary to enlarge the group. *S. lubuanus* has the epidermis thickly lamellose, almost velvety. The sagittate bands are more numerous than in the preceding group.

GROUP J (*Canarium*).

Shell small, but solid; *posterior sinus absent*, posterior canal a *slight groove in the calloused angle* at the suture; anterior sinus very near the canal; aperture finely ridged; lip margin with an *external rib*, but not expanded.

S. ustulatus, *dentatus*, *corrugatus* and *var. elegans*, *urceus* (= *floridus*), *hæmastoma*, *hellii*, *scalariformis*, *maculatus*.

Distribution: Red Sea to Hawaii and Australia.

In form and sculpture, *S. elegans* is very suggestive of *Rimella*, but the exaggerated canals of the latter genus sufficiently distinguish it.

Sub-group J 2.

Surface smooth or with low vertical folds, *polished;* lip sinus almost *merged into the canal;* body *drawn out*, narrowed. *S. samar* (*bulbulus*, *terebellatus*). Distr.: Japan to Australia and Polynesia.

The last two species are not before me, but apparently they are allied to *samar* and indicate close affinity of this group with the following. The accessory sinuses developed in *samar* must not be confused with the true lip-sinus.

GROUP K (*Seraphs*).

In this group, which need not be redefined, we find the culmination of the features incipient in *samar*. The lip-sinus is broad, basal and merged in the canal. The beautiful color-forms of the single protean living species of "*Terebellum*" inhabit the Indo-Pacific region from Mauritius to Japan and the Fijis.

GROUP L (*Rimella*).

Not studied. The living forms inhabit Chinese and Philippine waters.

GROUP M (*Rostellaria*).

Not studied. Red Sea to China and Moluccas.

The groups above recognized are probably by no means all of equal

rank. Nevertheless, each appears to be clearly distinct from all the others, and no species occur which cannot be at once referred to one or another of them. Whether they may be recognized as genera is mainly a question of personal opinion, but it seems evident to me, as I have intimated in several places, that the extreme forms, such as *Pterocera* and *Terebellum*, to which the older authors have unanimously given generic rank, are in nature more closely allied to the various types gathered into the old genus *Strombus* than the latter are to each other. One more relationship should be pointed out, namely, that apparently existing between groups G, H and J. It remains for the palæontologist and anatomist to verify or correct deductions based on the recent shells alone, and I await their final judgment.

SUPPLEMENTARY NOTES.

Strombus goliath.—Ponderous and distorted specimens of *gigas* are sometimes mistaken for this species, probably because Tryon remarks: "perhaps a variety of *S. gigas.*" Not long since, I had the good fortune to find a very fine example of the true *goliath* lying unknown and unhonored in a collection once famous but forgotten. So completely does it differ from all its cousins that none need ever mistake it. Through the munificence of Pres. Jesup, this king of Strombs is now enthroned at last in the American Museum, New York City.

Strombus costatus inermis.—Mr. Frederick Stearns reports "1 live mature shell" of this species from the Loo Choo Islands. Can a form so commonly reported from the West Indies be also living in Oriental waters? Or has an error crept in?

Strombus corrugatus.—I have been led to separate this (above) from *dentatus*, and to consider *elegans* a variety of it, judging by the material at hand. A few other forms, usually considered varieties, are restored to specific rank, merely as an expression of personal opinion.

Distribution: The *Strombinæ* occupy two great areas: An American, centering in the West Indies and spreading to Senegal, Brazil, and West America; and an Oriental, apparently centering in the Philippines, reaching to Natal, the Red Sea, Japan, Hawaii and the South Seas, and sending a single species (*granulatus*) into American waters. Europe has no living forms, although rich in fossil ones.

The Nautilus.

Vol. XIII. JANUARY, 1900. No. 9.

CHANGES WITH GROWTH OF LITHASIA OBOVATA (SAY).

BY BRYANT WALKER.

Having lately received from Mr. A. C. Billups, of Lawrenceburg, Ind., a package of unsorted material from the Falls of the Ohio, I have been able to trace out the various stages in the growth of this species, which are quite peculiar, and, I believe, have not been described.

The difference in shape between the mature shell and the young is very striking. In the adult, the very large, almost shouldered body, and long, narrow aperture, nearly twice as long as the short, rapidly acuminating and generally eroded spire, is characteristic of the species, and was well described by Say in his original description published in 1829; while the young shell, until it attains the sixth whorl, is almost spindle-shaped, and would be taken at first glance for a young Goniobasis; the spire is sharply conical, and longer than the aperture, which is broadly triangular, the long (columellar) side of the triangle being slightly concave.

The manner in which this remarkable change in shape is brought about is as follows:

The first two whorls are smooth and well rounded, and the apex rather obtuse. At about the beginning of the third whorl, a sharp carina is developed on the periphery of the body whorl, which rapidly increases in strength for the next four whorls. During this stage the

junction of the lip with the body whorl is beneath the carina, in some cases a short distance below, so that the carina is well marked on the upper whorls, but usually the lip starts from just under the edge of the carina, so that the side of the spire is almost straight, the edge of the carina projecting but very slightly, if at all, beyond the surface of the adjoining whorls; the aperture is decidedly triangular, both extremities being acutely angled, and the lip itself is sharply bent in the centre where the carina appears.

At about the beginning of the fifth whorl, the lip ascends and crosses the carina, and from thence, until it finally disappears altogether, the carina emerges from the upper part of the aperture. This change in the relative position of the lip and carina induces a radical change, not only in the shape of the lip, but of the whole shell. The lip, in order to clear the carina, becomes broadly rounded above and curves in rapidly to meet the body whorl at almost a right angle, forming a deep channelled suture, while the body whorl becomes more ventricose, more or less shouldered, and rapidly increases in size.

For about a whorl after the change takes place, the carina retains its size and position, but after the sixth whorl is reached it gradually diminishes and finally disappears entirely, although the body whorl at all subsequent stages of growth is more or less flattened in its upper part.

With the disappearance of the carina, the shell rapidly assumes its mature form and, with the usual erosion of the apical whorls, becomes the short, stout, heavy specimen customarily seen in collections.

NOTE ON THYSANOPHORA HORNII GABB.

BY HENRY A. PILSBRY.

My attention has been called by Mr. Geo. H. Clapp, of Pittsburg, to the fact that some specimens of *Thys. hornii* show very fine delicate cuticular riblets, more or less uneven at their free edges, and running much more obliquely than the growth-lines, on the surface of the last whorl.[1] This is usually obscured by the thin coat of earth which encrusts the shell, and which it is evidently the function of

[1] This structure has been lucidly described by Dall, Proc. U. S. Nat. Mus. xix, 1896, p. 336.

these riblets to collect. Only a good lens reveals this sculpture, and in specimens which have been collected dead, or cleaned by ordinary methods, it is usually lost. Still, a sufficiently patient examination will generally show some trace of it somewhere on most specimens. *Thys. conspurcatella*, of eastern Mexico, the type of the genus, has similar cuticular riblets, but they are more widely spaced and rather more persistent.

In young and half-grown shells, if perfectly preserved, the riblets bear rather sparsely scattered and long hairs, very delicate and easily rubbed off. I do not know that adults ever retain them; though in several Mexican species such hairs occur on the full-grown shell, and many West Indian species bear close bristles.

The foregoing observations are based upon the entire series of specimens in the collection of Mr. E. H. Ashmun, which he most liberally sent me for examination, and those in the collection of the Academy, including Gabb's types.

The published figures and descriptions of this species leave much to be desired. Gabb gives quite a good description, though none of his specimens show $4\frac{1}{2}$ whorls, as he states. The dimensions, "height .09, greatest diam. .16, smallest diam. .13 inch" $= 2\frac{1}{4}$, 4, $3\frac{1}{4}$ mm., are in a rough way accurate. The figures are bad.

Binney's figures (Man. Amer. L. Sh., p. 169, fig. 159) are too narrowly umbilicated, the spire is too conic, and the terminations of the lip do not approach enough. Moreover, they do not indicate the surface-sculpture. The whorls are described as "scarcely convex" whereas they are unusually so; the ends of the peristome are said to be "hardly approaching" while they actually converge so as to nearly meet in adult shells. The dimensions, "greater diam. 4, lesser $3\frac{1}{3}$, height 1 mm." are erroneous, the largest in Gabb's type lot measuring 4 mm. in greatest, 3.5 in least diameter, *with a height of 2.6 mm.* An adult specimen from Jerome, Arizona, collected by Mr. Ashmun, measures: diam. 3.5, alt. 2.3 mm.

Gabb's types were from "Fort Grant, at the junction of the Arivapa and San Pedro rivers," in Graham Co., southeastern Arizona.

Mr. Ashmun has collected specimens in the following localities: Jerome, Patagonia Mts., Crittenden, Prescott and Nogales, Arizona, and Cook's, New Mexico. The International Boundary Commission collected *hornii* at the summit of Hachita Grande Mt., Grant Co., N. M., and Dall mentions seeing the species from the drift of the Yaqui River, Mexico. No other localities are known for the species.

A NEW SPECIES OF CAPULUS FROM CALIFORNIA.

BY W. H. DALL.

Mrs. T. S. Oldroyd, of Los Angeles, Cal., recently sent me a species of *Capulus* which appears to be new, and which adds to the fauna of California a genus not hitherto known to belong to it.

Capulus californicus n. sp.

Shell only moderately elevated, oval or more or less conformable with the object upon which it roosts, the apex small, somewhat laterally compressed, incurved almost symmetrically, nearly concealing the smooth, one-whorled nucleus, situated near the posterior margin; surface nearly smooth, somewhat irregular, mesially with small faint radial not very close-set ridges, covered with an imbricated dense soft glistening periostracum which projects beyond the margins; interior polished, white, with faint rosy rays extending from the apex to the anterior margin; Alt. 10, lon. before the apex 30, behind it 5.5, total basal length 36.5, average width 29 mm.

This fine shell was found on the flat valve of *Pecten diegensis* Dall (*floridus* Hinds non Gmelin), in 20 to 25 fathoms off San Pedro, California.

Carpenter reported some fragments of *Capulus* from Mazatlan, but these were not really sufficient to establish the presence of the genus. The present species is related to *C. calyptra* Martyn, of Japan, and *C. hungaricus* of the northeast Atlantic. It is less elevated than either, the sculpture is much fainter than in *C. hungaricus* and the apex is less conspicuous, more posterior and less coiled.

I have several times received a small shell collected among kelp roots and variously mottled or tinted with purple or reddish-brown and yellow. A very young specimen of this kind was described by Carpenter under the name of *Psephis tellimyalis*. It is not a *Psephis* but has the characters of *Petricola*. I have suspected for a long time it was the young of *P. carditoides*, but have not yet seen enough material to make this certain, and therefore suggest that Pacific coast students should endeavor to solve the problem.

MOLLUSCA ASSOCIATED WITH MASTODON REMAINS.

I have received from Dr. Arthur Mead Edwards, the well-known microscopist of Newark, N. J., certain Molluscan forms for deter-

mination. It will be noticed, they are all common fresh-water species. The first lot includes *Planorbis parvus*, *P. campanulatus*, *Limnæa humilis*, *Physa heterostropha*, *Valvata carinata* and *V. sincera;* all of the above Say's species. The foregoing are from the "fossiliferous sands overlying the clays of Essex county," Ontario, Canada ("*Pleistocene*"), and are associated with Mastodon remains.

They were collected in 1897 by Dr. Henry M. Ami, of the Canadian Geological Survey, and sent to Dr. Edwards by the collector, presumably with microscopic material.

In the second lot, there is only the single species *Planorbis parvus* Say; this was found associated with Mastodon remains at Newburgh, N. Y., by F. W. Schaffer (in 1899), who sent the examples to Dr. Edwards. Of the species named herein, *P. parvus* and *L. humilis* exhibit a wide distribution in the past as well as in the present times. Both of these are reported as occurring living, and fossil, in the Lahontan and Bonneville areas of the Great Basin; *P. heterostropha*, living in both, but semi-fossil only in Bonneville. *V. sincera* credited to Salt Lake, living, by its collector Henry Hemphill, is represented as a semi-fossil in the Bonneville area by Call's var. *Utahensis*. The occurrence of living examples in either of the areas mentioned, is not noted in Call's list of Great Basin mollusca.[1] While *L. humilis* is everywhere, east and west, north, and pretty widely dispersed towards the south, *P. campanulatus* has a much more restricted range and has yet to be reported west of the Rocky Mountains.

I have to thank Mr. C. W. Johnson of the Wagner Free Institute for kind attention connected with the above.

ROBT. E. C. STEARNS.

Los Angeles, Cal., October, 1899.

DREDGING IN SAN DIEGO BAY.

BY F. W. KELSEY.

The use of the dredge has afforded me a great deal of pleasure, while furnishing me with a goodly amount of wholesome physical exercise so much needed by those following sedentary occupations, and the specimens thus obtained add largely to my local collection.

While working in the bay I use a dredge cutting but 14 inches,

[1] Bulletin No. 11., U. S. Geographical Survey.

operated from a roomy, flat-bottomed skiff propelled by oars, and I do most of my work alone, during the early morning hours while the water is quiet. The dredgings are carefully worked over while resting between "pulls," and when I am ready to return home the results of my day's work are, so to speak, "all in a nutshell."

In from 2 to 5 fathoms on mud bottom I find *Marginella pyriformis*, *Marginella regularis*, *Mgurella simplex*, *Drillia hemphilli*, *Eulima micans*, *Eulima rutila*, *Thracia curta*, *Mactra californica* (young), *Ollivella baetica*, *Angulus modestus*, *Angulus variegatus*, *Angulus obtusus*, *Dentalium neohexagonum*, *Lyonsia californica*, *Mangelia angulata* and *Cadulus nitentior*.

As we go toward the channel the depth increases and the bottom is a mixture of sand and mud. Here in from 5 to 8 fathoms we find *Yoldia cooperi* (young) and *Leda taphira*.

The channel proper ranges from 8 to 14 fathoms and the bottom generally consists of coarse, yellow sand and decomposed and broken shells, among which we find both live and dead specimens of *Semele pulchra*, *Corbula luteola*, *Isapis fenestrata*, *Isapis obtusa*, *Caecum californicum*, *Caecum crebricostatum*, *Scala hindsii* and *Aesopus chrysalloides*.

Scattered among the above species, we find many stray specimens of such shells as *Nassa perpinguis*, *Nassa cooperi*, *Nassa mendica*, *Nassa tegula*, *Calliostoma tricolor*, *Calliostoma gemmulatum*, *Calliostoma canaliculatum*, and many other species which are generally found upon the low flats at low tides and which are scarcely worth mentioning as dredge species. I find that for dredging in shallow waters a dredge made of galvanized iron without any net but having a screen bottom produces as good results as any, and is much more easily manipulated.

A LIST OF SHELLS FROM NORTHEASTERN MAINE.

BY OLOF O. NYLANDER, CARIBOU, MAINE.

The following is a list of land and fresh water shells collected in the northeastern part of Maine, principally along the Aroostook and Fish Rivers.

Valuable assistance has been received from Prof. H. A. Pilsbry and Mr. Bryant Walker.

All the Pisidia, and nearly all the minute land shells have been

critically examined by Dr. V. Sterki, without whose generous assistance it would have been impossible to determine the many small species.

There is some additional material in the hands of Dr. Sterki, which when straightened out will probably add a number to the list. Most of the species are distributed over the whole area, and the names of localities are only cited in referring to species that are very local in their distribution.

In this list are included a number of species that have been cited as doubtful in Maine, and the new species recently collected by me.

List of Species.

Acanthinula harpa Say. One specimen at Fort Kent.

Vallonia pulchella Müll. Gardens in Caribou and Presque Isle.

Vallonia excentrica Sterki. Rare, Caribou.

Polygyra albolabris Say. Not common.

Polygyra Sagii Binn. Well distributed.

Polygyra dentifera Binn. Rather common.

Polygyra monodon Rackett. Common in some localities.

Strobilops labyrinthica Say. Plentiful in this region.

Strobilops virgo Pils. Rare (identified by Dr. V. Sterki).

Bifidaria pentodon Say. "Resemble *curridens* more than any others I have seen" (Sterki). Near Caribou stream, Woodland.

Vertigo ventricosa Morse. Plentiful in some localities.

Vertigo ventricosa elatior Sterki. Common along streams, in Woodland, Caribou and New Sweden.

Vertigo bollesiana Morse. Rare; collected in woodland.

Vertigo Gouldii Binn. Not very abundant.

Vertigo Gouldii paradoxa Sterki. "Fine examples with the two palatal folds continuous and one angular" (*Sterki*). Woodland, rare.

Cochicopa lubrica Müll. Houlton, Presque Isle, Caribou, Fort Kent and Portage Lake, abundant in these localities.

Vitrina limpida Gld. Caribou and Presque Isle, found in large numbers this summer at Fort Kent.

Vitrea hammonis Strom. Fairly distributed.

Vitrea Binneyana Morse. Little Madawaska Lake and along Caribou stream in Woodland and Caribou.

Vitrea ferrea Morse. In company with *V. Binneyana*. These species are rarely found.

Conulus fulvus Mull. Everywhere.

Zonitoides arboreus Say. Common everywhere.

Zonitoides exiguus Stimp. Fairly common.

Zonitoides milium Morse. Quite rare. Woodland.

Pyramidula alternata Say. Common.

Pyramidula alternata alba. One living specimen obtained in the north of Woodland.

Pyramidula striatella Anth. Plentiful.

Pyramidula striatella? var. Shell greenish-white, animal nearly white. Can this be *Patula cronkhitei* Newc.? It is about the same size as *P. striatella.*

Pyramidula asteriscus Morse. Caribou, Woodland and Madawaska Lake. Rare.

Helicodiscus lineatus Say. Widely distributed, nowhere abundant.

Punctum pygmæum Drap. Rare.

Sphyradium edentulum Drap. Well-distributed.

Succinea obliqua Say. Common everywhere.

Succinea oralis Gld.

Succinea avara Say. Common in wet places on lake shores and river flats, together with *S. oralis.*

Carychium exiguum Say. Very abundant in wet places everywhere.

Carychium exile Lea. Not common; found with *C. exiguum.*

Aplexa hypnorum Linne. In ditches along the roads in three different places in Woodland; specimens abundant.

Physa heterostropha Say. Common in all streams.

Physa ancillaria Say. Only seen at Square Lake Inlet.

Lenmæa emarginata Say = *ampla Mighels* and *Limnæa emarginata* Mighels, Binn. From Cross Lake, Square Lake, Portage Lake, Fish River, Saint John River, at Fort Kent and Aroostook River.

This is an extremely variable species, Caribou individuals differ greatly in every locality.

Limnæa desidiosa Say. Aroostook River, Caribou stream, Salmon Brook.

Limnæa humilis Say. Common in damp places and ditches along the roads.

Planorbis trivolvis Say. Common in Barren Brook, Caribou. In Caribou Lake, Washburn, and in nearly every small lake I have seen in Aroostook county, fine specimens can be obtained.

Planorbis campanulatus Say. Cross Lake, Square Lake, Eagle Lake and Portage Lake.

Planorbis bicarinatus Say. Aroostook River, Fish River and Saint John River.

Planorbis bicarinatus aroostookensis Pils. East branch of Salmon Brook, Woodland, and Caribou stream, in Caribou.

Planorbis hirsutus Gld. Common and widely distributed.

Planorbis deflectus Say. Salmon Brook Woodland, rare; Portage Lake.

Planorbis parvus Say. Common in brooks and lakes.

Planorbis exacutus Say. Portage and Square Lakes; rare.

Planorbis crista Linné, *var. cristata* Drap. Barren Brook, Caribou. This species was recorded in THE NAUTILUS, Vol. X, page 117, by Mr. Bryant Walker as *P. nautileus* Linne. Mr. A. W. Hanham, on page 130, and Geo. W. Taylor, on page 139 of the same volume use the name of *P. nautileus*. Dr. v. Sterki and Prof. H. A. Pilsbry say "it is *Planorbis crista* Linné, var. *cristatus* Drap. It occurs in northern Europe."

Ancylus rivularis Say. Caribou stream, Collin's Millpond, very large specimens.

Ancylus parallelus Hald. Cross Lake and many smaller lakes and streams.

Ancylus ? Madawaska River, New Sweden.

Ancylus tardus Say. Aroostook River, Caribou.

Ancylus borealis ? Morse. Saint John River, Fort Kent. Mr. Bryant Walker says it is identical with this rare form.

Valvata tricarinata Say. Little Madawaska River, New Sweden and the Fish River Lakes.

Valvata sincera Say. Dredged in the Fish River Lakes.

Campeloma decisum Say. Widely distributed throughout Aroostook and Fish Rivers. Four young *sinistral* shells were taken from a normal dextral female from Portage Lake.

Amnicola limosa Say. Common everywhere, and very variable in form. In my former article in THE NAUTILUS, Vol. xi., p. 10, it is called *Pomatiopsis*.

A. Cincinnatiensis Lea.

Unio complanatus Sol. Lakes and streams; common.

Margaritana margaritifera Linné. Aroostook River.

Margaritana undulata Say. Lakes and rivers.

Anodonta fragilis Lam. Generally distributed, some very large specimens in the muddy bottom of Salmon Brook Lake. Perham.

Sphærium simile Say. Generally distributed.

Sphærium striatinum Lam. Fish River and Saint John River at Fort Kent.

Sphærium rhomboideum Say. Fine specimen in *Gelot Lake*, New Sweden, and all the smaller lakes of the Little Madawoska river system.

Calyculina securis Prime. Aroostook River.

Calyculina securis cardissa Prime. Square Lake and other localities.

Pisidium abditum Hald. Common.

Pisidium adamsi Prime. Cross Lake Inlet.

Pisidium æquilaterale Prime. Portage Lake. Little Madawaska River.

Pisidium contortum Prime. Rear Mud Lake, Perham and Westmoreland.

Pisidium compressum Prime. Generally abundant.

Pisidium ferrugineum Prime. Fogelin Lake, New Sweden and many other localities.

Pisidium fallax Sterki. Aroostook River.

Pisidium fallax boreale Sterki. Aroostook River at Caribou and Little Madawaska River, New Sweden.

Pisidium milium Held. South branch Caribou Stream, Woodland and Sawyer's Brook, Castle Hill.

Pisidium medianum minutum Sterki. Hacket's Mill Brook, a tributary of Caribou Stream in the northern part of Woodland.

Pisidium pauperculum Sterki. Little Madawaska River.

Pisidium pauperculum nylanderi Sterki. Dredged in Portage Lake.

Pisidium politum Sterki. Portage Lake and Cross Lake.

Pisidium punctatum Sterki. Portage Lake, Little Madawaska River.

Pisidium roperi Sterki. Johnson Brook on the Fort Kent road and north of Perham.

Pisidium splendidulum Sterki. Barren Brook, Caribou and many other localities.

Pisidium ventricosum Prime. Barren Brook, Caribou.

Pisidium variabile Prime. Common everywhere.

Pisidium walkeri Sterki. Barren Brook, Caribou.

Pisidium walkeri mainense Sterki. Hacket's Mill Brook, Woodland and many other localities.

SOME ZONITIDÆ COLLECTED BY J. H. FERRISS IN ARKANSAS AND THE CHOCTAW NATION.

BY HENRY A. PILSBRY.

Some account of shells collected by Mr. J. H. Ferriss in Arkansas and Choctaw Nation was published in THE NAUTILUS for August of this year. A series of *Zonitidæ* collected at the same time affords some interesting data. *Vitrea simpsoni* (Pils.) was taken at Poteau, in the eastern part of the Choctaw nation on Poteau river, near the State of Arkansas. It resembles *V. capsella*, but differs in the triangular form of the aperture.

Gastrodonta demissa, typical, was taken in Arkansas near Texarkana, and at Tushkahomma and Poteau in the Choctaw Nation.

At both Tushkahomma and Poteau a form having the characteristic lens-shaped contour, brilliant gloss and basal striation of *demissa* occurred, differing from *demissa* in having a long and strong lamella within, like the outer lamella of *G. gularis*. There is no trace of an inner or columellar lamella, such as *gularis* and *suppressa* generally show, and the general form of the shell is entirely that of *demissa*, quite unlike *suppressa*. The umbilicus is a small round puncture, as of a pin stuck through a sheet of paper, quite as in typical *demissa;* and the periphery is subangular. In *G. suppressa* the periphery is well rounded and the umbilicus larger. This variety may be called var. *lamellata*. It is most interesting as connecting the *gularis* group with the *ligera* group of Gastrodonts.

The form I described some years ago as *Zonites brittsii*, from Hot Springs, Ark., belongs also to *demissa*, from which it differs in the imperforate axis, and very slight excavation of the base in the center.

A NEW AMERICAN LAND SHELL.

BY HENRY A. PILSBRY.

Polygyra uvulifera bicornuta n. v.

Shell differing from the typical *P. uvulifera* (the type locality of which is Long Key, above mouth of Sarasota Bay), in being less depressed, the last whorl strongly grooved within the umbilicus, the aperture everywhere more contracted; parietal margin of the peristome strongly elevated, produced in *two erect processes* or "horns," one at the junction of outer lip and parietal lip, *another upon the parietal lip near its inner termination*, situated like the corresponding lobe

of *P. auriculata;* a conspicuous pit penetrates under the parietal fold. Striation fine but regular and equally developed above and below. Size about that of typical *uvulifera.*

Alt. $6\frac{3}{4}$, greatest diameter $14\frac{1}{2}$ mm.

Alt. 6, greatest diameter 14 mm.

Alt. $6\frac{1}{3}$, greatest diameter 13 mm.

Aripeka, Hernando Co., Fla. (Mr. Geo. Pine); Hernando Co. and Longwood, Fla. (Mr. Van Hyning's coll.).

This form resembles *P. auriculata* at first sight, but the deep notch in the basal lip near its inner end, and the peculiar, flat, forward-running inner end of that lip, as well as the strong semicircular ridge on the parietal margin, one end of which enters the deep notch mentioned, the other forming the lower border of the main parietal fold —all ally it rather to *P. uvulifera.* In *P. auriculata* there is no such notch in the basal lip, and the inner end of the latter is attenuated, not flattened and bent forward. It is an interesting intermediate form.

P. uvulifera varies a good deal in texture, color, size and striation, the largest and most solid shells before me being from Long Key, the type locality, where they are nearly smooth, the striation obsolete; diam. 13–14 mm. I have seen a great many specimens from both sides of the peninsula and the keys, but saw no variation toward the variety described above.

In most localities *P. uvulifera* diverges from the "historic type," as found on Long Key, in being less chalky, and decidedly more strongly striate, the striæ thread-like. The size varies with locality. Thus at Miami, where it is numerous about a mile up the river on the south side, they measure 9 to $10\frac{1}{2}$ mm. diameter. They occur here under stones (limestone) in a hot, sparsely-wooded plain exposed to the sun, in company with *P. cereolus carpenteriana, Urocoptis, Macroceramus* and *Chondropoma* with an occasional *Vaginulus,* and moderate numbers of large black scorpions and tarantulas. At Palm Beach they are much larger, diam. $12\frac{1}{2}$–13 mm., and here the soil is sandy, and the forest luxuriant.

Mr. Pine sent numerous specimens of *uvulifera* from Hernando Co. which differ from the Long Key types in being strongly striate and smaller. They are more narrowly umbilicated than *P. uvulifera bicornuta,* with the opening rather less contracted, the umbilical groove on the last whorl generally less strong, and they want the accessory "horn" of the parietal margin. They are also more coarsely striate, and may be separated from young or immature *bicornuta* by the narrower umbilicus. I do not know whether these occur with the variety or at separate stations. The largest sent measures 12 mm. diameter.

P. auriculata extends some distance down the east coast, and over to the middle of the State in the lake region. I have never seen it from the west coast counties, and would be glad to have data on its occurrence there if it has been found.

UNIO HAGLERI FRIERSON.

The Nautilus.

Vol. XIII. FEBRUARY, 1900. No. 10.

A NEW ALABAMA UNIO.

BY LORRAINE S. FRIERSON.

Plate II.

Unio (Pleurobema) Hagleri.

Shell smooth, elliptical, unequilateral. Length, 2.1. Height, 1.6. Diameter, 1 (inches). (Dimensions are of a medium-sized shell; they are sometimes larger.)

Beaks low; umbos somewhat inflated; umbonal slope rounded. Epidermis dark reddish brown, striate, rayless. Lines of growth numerous and well impressed. Nacre white, rarely rose, frequently spotted with green, iridescent in posterior. Teeth double in left valve, single in the right. The anterior sinistral cardinal tooth is wedge-shaped, and nearly squarely cut off on top. Its axis is inclined at an angle of about 75° with that of its fellow, which is low, thick and triangular. The laterals are stout and slightly curved. Dorsal plate rather large. Muscle scars frequently confluent in front. Distinct behind and well impressed. Pallial scar well impressed in front, fainter behind.

Cavity of the beaks shallow. Cavity of the shell excavated from the region of the beaks toward the posterior margin. The shell varies in form from an almost perfect ellipse (lower figure) to a form swollen in the post-basal region (upper figs.) similar to the females of *Lampsilis*. But there is no good reason to suppose this a sexual character.

Habitat, North River, Alabama, near Tynes. Examples may be seen in the National Museum and in the cabinet of Mr. W. A. Marsh, of Aledo, Illinois, and in my own. Thirty specimens received. The shell is allied distinctly to *instructus* Lea, and also to *rubellus* Conrad, and to *troschelianus* Lea. Some of them remind one of *fassinans* Lea.

From *rubellus* Conrad it may be distinguished by being longer, not so stout or inflated. It need not be confounded with the other shells named, as it differs from them entirely, although allied. It is named for the collector. Figured specimens are deposited in coll. Acad. Nat. Sci., Phila.

SPECIES OF CHLOROSTOMA OF SOUTHERN AND EASTERN PATAGONIA.

BY HENRY A. PILSBRY.

The genus *Chlorostoma* is essentially Pacific, being chiefly developed upon the Pacific shores of Asia and North and South America. The former open strait between the Americas allowed it to spread to the Antillean region and eastern shores of the United States, where a number of species have existed from the tertiaries to the present time. A few forms also found their way around Cape Horn. The species have been generally divided between two genera, *Omphalius*, including the umbilicate forms; but this division is purely artificial and unnatural, very closely allied species being separated by it. It would be better to drop *Omphalius* into the rubbish-heap of synonymy. The etymology of *Chlorostoma*, "green mouth," is not very appropriate to most of the species.

There are no species of the genus known from European or African seas. On the eastern coast of South America, south of Brazil, the following occur:

Chlorostoma patagonicum (Orbigny).

Trochus patagonicus Orb., Voy. dans l'Amér. Mérid., Mollusques, p. 408, pl. 55, f. 1–4 (1835–1846).

Trochus corrugatus Koch in Philippi, Abbild. u. Beschreib, etc., I, *Trochus*, pl. 2, f. 7 (Nov., 1843).

This species was found by d' Orbigny in the Bay of San Blas, Patagonia; Philippi gives the locality Brazil. Dr. Wm. H. Rush collected a few specimens in Maldonado Bay, Uruguay. The sculp-

ture is very fine grained, the suture narrow but deeply plowed, and the columella armed with two or three small denticles at the base, as in the genus generally. The outer lip is weakly grooved within on the thick part near the margin. The deep umbilicus readily separates this species from the following form.

The exact date of d'Orbigny's publication of this species is not known to me.

Chlorostoma Hidalgoi n. sp.

Shell very similar to *Chlorostoma patagonicum* Orb., (*Trochus corrugatus* Koch), *but wholly imperforate*, the umbilical region covered with a white callus. Fleshy-cinereus, with the apex eroded, white. Sculpture of crowded spiral series of small, irregular granules, similar to those of *C. patagonicum*. Spire conic, periphery rounded, the base flattened. Aperture very oblique, somewhat triangular; columella armed with two small teeth at its junction with the basal lip.

Alt. 15, diam. 17 mm.

"Rio Negro, Patagonia," coll. A. N. S. P.

This form differs conspicuously from *C. patagonicum* Orb. (*corrugatus* Koch) in the completely imperforate axis, the other species being conspicuously umbilicated at all stages of growth. *C. Hidalgoi* is also more conical. In color, sculpture, and the deeply scored suture, the two species are extremely similar.

It is named in honor of the author of the *Moluscos del Viaje al Pacifico*, a meritorious work on the South American fauna.

Chlorostoma Orbignyanum, n. sp.

Shell imperforate, conic, with flattened base; purplish-gray, with blackish spirals above, black below. Surface dull, sculptured with numerous low spiral liræ, several below the suture obscurely beaded, the others nearly smooth; the liræ near the suture separated by narrow intervals, those toward the periphery more widely spaced, with one or several interstitial threads in each interval. There are about 10 liræ on the penultimate whorl, and 10 below the periphery on the base. Whorls 5, very convex, separated by deep sutures, the last whorl flattened below the suture, obtusely angular at the periphery; the base free from spiral sculpture in the center, eroded and brilliantly pearly in front of the aperture. Aperture very oblique, pearly within, with a rather wide dull border within the thin outer lip, acute; columella short, concave, porcellanous, terminating in a small tubercle below, adjacent to which there is a minute denticle;

umbilical region somewhat callousod, the place of the umbilicus marked by a moderately sunken pit, surrounded by a weak spiral rib which terminates in a faint denticle at the junction of the columellar and basal margins of the peristome. Alt. 14, diam. 16½ mm.

Beagle Channel, Patagonia (Dr. H. von Ihering).

This species (No. 1020 of von Ihering's register) is obviously unlike the forms of eastern Patagonia, and there is nothing like it in Mabille and Rochebrune's work on Cape Horn mollusks. Of the Chilian species, it is allied only to *C. fuscescens* Phil.,* but in *C. Orbignyanum* the whorls are more convex, the prevailing color black, and it is imperforate.

ON A COLLECTION OF FRESH-WATER SHELLS FROM RHODE ISLAND.

BY FRANK C. BAKER.

During the month of July, 1899, the writer made a collection of marine and fresh-water shells in the state of Rhode Island, and a list of the fresh-water species may be of interest. Collections were made at the following places:

1. Nayatt, R. I. A small pond between the railroad depot and the bay. The bottom is made up of soft, black, carbonaceous mud, and the shores are lined with dead leaves and twigs.

2. Newport, R. I. Bailey's Pond, near Bailey's Beach. A pond of good size and considerable depth, bordered by cat-tails.

3. Providence, R. I. Cat Swamp. A small clear stream, flowing through a flag-swamp. The numbers after the species indicate the above localities.

Calyculina partumeia Say. 1, 2. Common.
Calyculina truncata Linsley. 1. Common.
Calyculina securis Prime. 2. Not common.
Pisidium, near *abditum*, but possibly *P. lens* Sterki. 1. Common.
Pisidium splendidulum Sterki. 1, 2. Not common.
Limnæa palustris Müller. 3. Common.
Planorbis trivolvis Say. 2, 3. Common.
Planorbis deflectus Say. 1. Common.
Planorbis parvus Say. 1, 2, 3. Common.

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* Conchylien Cabinet, *Trochus*, p. 182; Man. of Conch., XI., *Trochidæ*, p. 181.

Segmentina armigera Say. 1, 2. Common.
Physa heterostropha Say. 1, 2, 3. Common.
Aplexa hypnorum Linné. 2. Common.
Campeloma decisum Say. 1. Apparently not common.
My thanks are due to Dr. V. Sterki for determining the Pisidia.

JOHN H. THOMSON, PH. D.

The subject of this memoir was born in Westport in 1824, and died in the city of New Bedford, Mass. (but a few miles from his birthplace), July, 1896, aged 71. He had the usual public school and academic education of the time. In early life, like so many New England coast town boys, he took to the sea, and soon reached the post of master. He spent some years in California and South America, and returning to New Bedford, he settled there for life. He developed an early fondness for natural history, and in this, finally narrowed down to the science of conchology. He at once became fascinated with the subject, and spared no time, pains, or money in his enthusiastic determination to master his subject. He was fortunate at this juncture to fall into the hands of so capable and sympathetic an instructor as Dr. Augustus A. Gould, to whom he ever felt grateful for giving him a fuller and clearer insight into the delicate minutiæ, so essential in describing many species and varieties of shells. By this association he was greatly aided and stimulated in his subsequent pursuit and study. He soon became known as a most conscientious and reliable student of conchology, and soon made many friends; his correspondents were among the most noted of his time, in both hemispheres. He obtained and carefully studied the works of the leading conchological authorities, without regard to price, although he was never a rich man.

As a collector, his success in securing species from remote parts was really phenomenal. He sold his earliest and largest collection, during the Franco-Prussian war, to an institution, I think, in Belgium, but through the misfortunes of war it was in some manner confiscated, and so the purchaser lost his prize. His later and last collection is owned by the writer of this article. Among the many societies of which Dr. Thomson was a member, two stand preeminently conspicuous, The Zoölogical Society of London and the Academy of Natural Sciences of Philadelphia. I am credibly in-

formed the degree of Ph. D. was bestowed upon him by Columbia College of New York City.

Among his published articles is a monograph on the Terrestrial Mollusca of his native county. He was a most careful and painstaking worker in his chosen field, and was an acknowledged authority among his peers. The doctor was a most delightful companion, and the many hours he spent in my family are remembered and cherished with keenest pleasure. To that noble band of pioneers in conchological study and labors in the United States (of whom, alas, so few survive) we offer our most grateful thanks, and to the departed write, *Requiescat in pace.* A. B. KENDIG.

Brookline, Mass., Dec. 19, 1899.

NEW SPECIES AND SUBSPECIES OF AMERICAN LAND SNAILS.

BY HENRY A. PILSBRY.

Pyramidula alternata rarinotata n. v.

Similar to the typical form in size, form and sculpture, but very sparsely marked with comparatively small chestnut spots on a pale brownish-corneous or dirty buff ground; streaks on the base nearly obsolete.

Caldwell, Fayette and Jackson counties, Texas.

Mr. Bryant Walker called my attention to this form, sending specimens from Caldwell and Fayette counties, collected by Mr. J. A. Singley; and I find in the collection of the Academy some specimens sent me by Hon. J. D. Mitchell, from the Navidad River bottom, Jackson co.

Zonitoides neomexicanus Cockerell & Pilsbry, n. sp.

Shell minute, depressed, in form similar to *Zonitoides minusculus;* whitish corneous, somewhat translucent, fragile, the umbilicus wide, its width contained $2\frac{1}{2}$ times in the greatest diameter of the shell. Surface marked with very fine but rather sharp growth striæ, and *crowded, microscopic spirals* throughout, the spirals conspicuous *to the apex.* Whorls $3\frac{1}{2}$, quite convex, the last everywhere well rounded. Aperture round-lunate, the penultimate whorl excising about one fourth the circumference of the peristome; lip thin and acute, a little dilated at the columellar margin.

Alt. nearly 0.8, greatest diameter 1.7 mm. Another specimen is slightly larger, diam. about 2 mm.

Dripping Spring, Organ Mts., New Mexico, about 5,700 feet alt., Sept., 1899, coll. by T. D. A. Cockerell.

This species differs from all the *minusculus* group in being conspicuously though very minutely striate spirally, the striæ extending to the very apex, as in the southern race of *Zonitoides milium*. It differs from *milium* in wanting the peculiar wrinkle-sculpture so characteristic of that form. *Z. exiguus* is evidently a nearer cousin of the new form, having a similar system of spirals, likewise extending upon the nepionic whorl, but it is larger, with less broad umbilicus, and a conspicuously different coarser sculpture of oblique laminæ. *Zonitoides neomexicanus* may well go between *exiguus* and *milium* in the list of species.

FIELD NOTES AND REMINISCENCES.

Mr. Simpson's entertaining account of *Helicina Dysoni* under difficulties, in the June, 1897, NAUTILUS, is exceedingly entertaining; the shower of Helicinas that followed the stirring up with a pole was decidedly unique, the first of the kind on record, for though "raining cats and dogs" is an old story, a shower of snails, like *snailing with a pole*, is a new departure. As an humble disciple of Izaak Walton, I have in years gone by done considerable in the way of *fishing with a pole;* the man that goes snailing with a pole will bear watching—by the snails. The special habitat or station of *H. Dysoni*, roosting in the palms, brought to mind what my friend, the late Henry Edwards, well known as a good entomologist, good actor and a good fellow, told me about the habits and habitat of the curious *Helix* (*Paryphanta*) *Busbyi* collected by him in New Zealand. (The specimens he gave to me are now in the U. S. National Museum.) *Helix Busbyi* lives in the tops of the tall Kauri pines, hiding in the axils where the birds "go for him." In order to separate the soft parts, which they want, from the shell, which they do not want, they seize the animal when protruded from the shell and whack away to the right and left against the twig or branch they are perching on until their purpose is accomplished, when the shell drops to the ground, and is found generally in a battered condition. The Maoris have a name for these shells which signifies that they come from heaven, which is probably a mistake.

When in Florida, in 1869, on Long Key, one pleasant morning I noticed several specimens of *Polygyra septemvolva* here and there on the sand. "All dead," I said to *myself*, lest the snails might hear me, "there must be fire where there is so much smoke, there must be live snails where there are so many dead ones," so I started in to hunt close. After a while I detected them snugly lurking in the axils of some very large thistles. I did not gather them in, as Simpson did, when on the war path for his Helicinas, by charging on 'em with a pole. My legs being well protected by high-cut hunting boots, I kicked out vigorously *a la mustang* in an underthrust way against the butt of the thistle plants, and the result was a jerking of numerous snails hither and yon in a somewhat promiscuous way; the success of the performance, judged by the result, caused me to second the motion, and I gathered in a goodly number, enough for my own collection and for distribution among my friends. What the snails thought of the performance I have never learned, and Simpson, it will be noticed, is reticent on this point touching his *Helicinas*.

As to my prowess as a collector, it would be unwise to say anything as long as my friend Henry Hemphill is on the face of the earth, but I dare to say that dear old Doctor Newcomb, of blessed memory, was so generally successful in that line as to justify my placing him near the head of the class. Well, the good Doctor and myself once on a time, away back in June, 1867, went conchologizing up the coast of California to Bodega Bay. We found the collecting ground very limited in extent, though we got about 90 species; we also gathered in nearly 500 dead shells of *Helix Nickliniana*, grouped formerly with *Arionta*, but now Doctor Pilsbry, expert, editor, etc., comes to the front and unblushingly says these west coasters must tumble to the name of *Epiphragmophora*, which is hard on the poor snails, and a rather long word to write. Well, there were hundreds of 'em on the surface of the sand, but *not one living one* could we find. That is what we didn't get, *one live Nickliniana*. Where they kept themselves we couldn't discover. We hunted high, we hunted low, dug into the sand around the roots of the stunted shrubs that manage to live in this cold, windy, exposed locality, and rummaged about generally, without success, and when the sun went down we retired from the field in good order with our flags at half mast, somewhat the worse for the rough day and bad luck in the snail business, though we had the pleasure of each other's company, and that counts

for a good deal as the world goes. Probably the snails had stepped out through fear of being called *Epiphragmophora;* who knows? perhaps, Dr. Pilsbry can tell, *he* ought to know. R. E. C. S.

[But I don't.—H. P.]

SOME NOTES ON RUMINA DECOLLATA LINN.

BY C. W. JOHNSON.

In March, 1897, Mr. T. L. Montgomery, Librarian of the Wagner Free Institute of Science, brought from Bermuda some live specimens of *Rumina decollata.* Some of these were given to my young friend, Mr. H. S. Viereck, while the others were placed among some plants kept in the museum of the Institute. Mr. Viereck placed them in his yard in Philadelphia. They flourished and increased greatly in numbers during the summer and survived the winter of 1897–98. During the summer of 1898 they again thrived, but in the following spring only dead shells could be found; the blizzard of February, 1899, was probably too severe for them.

The specimens kept at the Institute are still vigorous, but produced only one brood. Through the kindness of Mr. Viereck, I obtained, in September, some live European *Helices*, including *Helicella ericetorum*, collected by his sister in Germany. An old aquarium was quickly turned into a snailery; thinking that the *Rumina* would enjoy new quarters, a few were also placed in the snailery. A day or so afterwards, when giving the Helices some cabbage leaves, I noticed that the *Rumina* seemed very close to the *Helicella.* On picking up a specimen, I was greatly surprised to find the former greedily devouring the poor *ericetorum.* I could not blame the carnivorous fellow, for it was probably the first "square meal" it had had since it was taken from its island home. The lesson to be learned is, do not put your carnivorous and herbivorous shells in the same quarters, if you want to keep both alive.

GENERAL NOTES.

Limax coccineus, Gistel.—Through the kindness of Dr. T. S. Palmer, I have been able to see the hitherto overlooked description of *Limax coccineus*, Gistel, Naturgeschichte des Thierreichs, 1848,

p. 168. This slug is said to be 9″ long, bright red (hochroth) in front, with blackish stripes behind the head, tentacles red-granular, mouth, white. Is it not surely the common red *Arion* of Central Europe, now known as *A. rufus* (or *empiricorum*), var. *lamarckii*, Kal., 1851? If so, Gistel's name *coccineus* has priority for the variety, and must be adopted.

This work of Gistel's has in it several other new names for mollusca. On p. 173, *Eugira* is proposed for *Iridina*, Lam. This appears to be needless, but some may hold that it interferes with the later *Eugyra*, Ald., 1870. The following are supposed new species: *Helix platychela* from Sicily, p. 167; *H. erycina* from Sicily, p. 167; *H. jenisoniana* from Montenegro, p. 167; *Clausilia grossa* from Croatia, p. 167; *Bulimus meridionalis*, p. 167; *B. pellucidus* from S. Russia, p. 167; *Linnæus flavescens* from Spain, p. 168. The *H. platychela* and *erycina* are probably the Sicilian forms already in the literature, otherwise credited. *Clausilia grossa* may be the species of Ziegler. The other names seemed to have been overlooked.—T. D. A. Cockerell.

Polygyra auriculata in Western Florida.—Mr. L. E. Daniels, of La Porte, Indiana, has recently sent me typical specimens of *P. auriculata* collected by him in a hammock one mile south of Tampa, Florida, thus supplying an authentic gulf coast locality for the species. Since they were received, I thought to look in Mr. C. T. Simpson's "Contributions to the Mollusca of Florida," Proc. Davenport Acad. Nat. Sci., V., 1889, p. 65, where he reports *P. auriculata* as common in Manatee county. There is a possibility that some locality records for *auriculata* may have been based on specimens of *P. uvulifera bicornuta*.—H. A. P.

Correction to List of Shells from Northeastern Maine in January Number.—Page 103, line 12, for *hurpa* read *harpa*.

Page 103, line 16, for *Sagii* read *Sayii*.

Page 103, line 28, for fine read five.

Page 104, lines 27, 28, read *Limnæa emarginata mighelsi* Binn.

Page 104, line 30, omit *Caribou*.

Page 105, line 33, read *Pomatiopsis cincinnatiensis* Lea, and line 34 omit *A. cincinnatiensis*.

Page 106, line 13, for rear read rare, and for Westmoreland read Westmanland.—Olof O. Nylander.

PUBLICATIONS RECEIVED.

SYNOPSIS OF THE SOLENIDÆ OF NORTH AMERICA AND THE ANTILLES. By Wm. H. Dall. (Proc. U. S. Nat. Museum, Vol. XXII, pp. 107–112, 1899.)—In monographing the fossil species, Dr. Dall has found it necessary to make many changes in nomenclature involving many of the recent species. The following is a list of the recent species as revised by Dr. Dall:

East American Species.

Solen viridis Say. Rhode Island to Georgia.

Solen (*Solena*) *obliqua* Spengler. Cuba, Porto Rico, St. Thomas. (*S. rudis* Sowb. not C. B. Ads. + *philippinarum* Sowb. not Hanley are synonyms.)

Ensis directus Conrad. Labrador to Indian Key, Florida, Pliocene to recent.

("*E. americana* Beck," of H. & A. Ads., is probably a manuscript name. *Solen siliqua* Chickering, not Linn, is a synonym. This species was generally confounded with *Solen magnus* Schumacker, under the name of *Solen ensis* Linn., by the earlier American authors.

In this connection Dr. Dall seems to have overlooked as a synonym *S. americana* Gould. (Invertebrates of Mass., Binney ed., p. 42, 1870), a name used by most American conchologists. *Solen directus* was described by Conrad (Proc. Acad. Nat. Sci., p. 325, 1843) as a fossil, from what he considered a miocene deposit fifteen miles below New Berne, N. C. This formation is now known as the Croatan beds of the Pliocene.

Ensis minor Dall. Cape May to Florida and Texas. "This is *Solen ensis* var. minor of some of the earlier writers, and bears to *E. directus* the same relation the *Ensis ensis* Linn., of Europe, does to the North European *E. magnus* Schum. It differs from the young of *E. directus* in having the valves wider behind than in front and relatively narrower as a whole.

Siliqua squama Blainville, Grand Banks of Newfoundland and Gulf of St. Lawrence.

"This is *Machæra nitida* Gould, and *Cultellus medius* Sowb. (not Gray)."

Siliqua costata Say. Gulf of St. Lawrence south to Cape Hatteras, N. C.

"The following are synonymous names: *Solecurtoides nahantensis* Desmoulins; *S. sayi* Gray; *S. radiatus* Ravenel (not Linnæus);

Cultellus grayanus Sowb. (not Dunker?); *Cultellus subsulcatus* Sowb.; *Cultellus belcheri* (as of Gray manuscript) Sowb.; not *C. costatus* Middendorf nor Sowerby.

Psammosolen sanctæ-marthæ (Chemn.) Orbigny. N. Carolina, Bermuda, the Antilles and south to Rio Janeiro.

Psammosolen cumingianus Dunker. N. Carolina to Texas and São Paulo, Brazil.

West American Species.

Solen sicarius Gould. Vancouver Island to San Pedro, California.

Solen rosaceus Carpenter. Santa Barbara, Cal., south to the Gulf of California.

Solen mexicanus Dall. West coast of Tehuantepec, Mexico.

Solen (*Solena*) *rudis* C. B. Adams. . Panama.

"Confounded with *S. obliquus* Spengl. of the Antilles, by Carpenter and Sowerby."

Ensis californicus Dall. Monterey, Cal., south to the Gulf of California.

Siliqua lucida Conrad. Monterey to San Diego, Cal.

Confounded with the young of *S. nuttallii* by Carpenter and Gabb.

Siliqua media Gray. Okhotsk and Bering Seas northward to the Arctic Ocean at Cape Lisburne.

Syn. *Machæra costata* Midd. (not Say); *S. borealis* Conrad.

Siliqua patula Dixon. Okhotsk Sea, the southern border of Bering Sea and the Gulf of Alaska to Sitka.

Syn. *Solen maximus* Wood (not Gmel.); *S. gigas* Dillw.; *S. grandis* (Hinds' manuscript, as of Gmelin) Dunker; Carpenter; *S. splendens* Chenu.

Siliqua (*patula* var.) *alta* Brod. and Sowb. Bering Sea and Strait.

Syn. *Cultellus costatus* Sowb. (not Say).

Siliqua (*patula* var.) *nuttallii* Conrad. Lituya Bay, Alaska, south to Oregon and Monterey, California.

Syn. *S. californica* Conrad, and *S. nuttali* Sowb.

The following new species are described:

Solen mexicanus. Gulf of Tehuantepec.

Ensis californicus. From 14 fathoms sand, off the Island of San Pedro Martir, Gulf of California.

Tagelus poeyi. Cuba; mouth of Old River, Belize; Greytown, Nicaragua, and Rio Grande do Sul, Brazil. Some scattered notes on *Tagelus gibbus* Spengler, are also given.

THE NAUTILUS.

VOL. XIII. MARCH, 1900. No. 11.

NOTE ON PETRICOLA DENTICULATA Sby.

BY W. H. DALL.

The enquiry suggested by me in the NAUTILUS for January (p. 100) has been quickly answered. Mrs. Oldroyd has kindly forwarded to me three specimens of *Petricola* from Long Beach, Cal., collected by Mrs. Blood, which solve the problem as to the adult form of Carpenter's *Psephis tellimyalis* beyond all shadow of a doubt. The little brown radiated nepionic shells appear with astonishing distinctness against the white shell of the adult *Petricola*. What is still more curious is that these dark-colored tips must fade, as in all the museum series extending from San Pedro to Peru not a single one retains the color, and one of Mrs. Blood's specimens has very little. There are two species of *Petricola*, belonging to the section *Petricolaria* Stoliczka, on the coast of California, neither of which goes much north of San Pedro. One is the elongate *P. cognata* C. B. Adams (the analogue of the east coast *P. pholadiformis*), also named *gracilis* by Deshayes. The other has the following synonymy, and very likely more.

PETRICOLA DENTICULATA Sowerby.

P. denticulata Sby. P. Z. S., 1834, p. 47.

P. ventricosa (Deshayes Ms.) Sowerby, Thes. Conch., p. 773, pl. 166, figs. 6, 7, 1854 (in synonymy).

P. nivea Sowerby op. cit., p. 773, *pro parte*, not of Gmelin, 1792.

P. tenuis Sowerby 1834, C. B. Adams and others, *pro parte*.

Psephis tellimyalis Cpr. B. A. Rep. Moll. Western N. Am., p. 641, 1864; Journ. de Conchyl. xii, p. 135, 1865 (larval shell).

This species belongs to the middle American or Panamic fauna and is known to extend as far north as San Pedro and south to the Peruvian coast. The *P. cognata* is somewhat more restricted and seems most abundant in the Gulf of California. It has been found as far north as San Diego. The *P. nivea* (*Mytilus niveus* Chemn.) Gmelin, is an Indo-Pacific species, very similar to *P. denticulata* and confounded with it by most of the early writers.

DESCRIPTION OF A NEW CALIFORNIAN LAND SHELL.

BY F. W. BRYANT.

Epiphragmophora Bowersi, n. sp.

Shell umbilicated, convex; epidermis olivaceous; spire slightly elevated; whorls between 4 and 5, convex, gradually increasing; suture well defined; aperture transverse, nearly circular; peristome whitish, thin, very slightly expanded at the basal portion, at the columella broadly reflected, yet leaving the umbilicus entirely open, showing within the whorls to the apex; base convex.

A well-defined, moderately broad, light-chestnut band revolves above the centre of the body whorl, and is visible above the suture on the whorl preceding the last; lines of growth close and distinctly marked.

Greater diameter 13, lesser 10, height 6 mm.

Location, San Jacinto Mts., Riverside County, California.

THE CORROSION OF SHELLS IN CABINETS.[1]

The above is the title of a paper of the greatest importance to all collectors of shells, and especially to those having charge of museums where the shells are usually glued to cards or tablets. Although no corrosion of shells has been noticed in the collections of this country, it is well to be on the lookout, and to guard against all apparent causes.

[1] The Corrosion of Shells in Cabinets. By L. St. G. Byne, M. Sc. With a prefatory note by T. Cosmo Melvill, M. A., F. L. S. The Journal of Conchology, Vol. ix., pp. 172–178, and pp. 253–254, 1899.

Mr. Melvill says: I first noticed the deterioration of a *Mitra* (*Zierliana*) *ziervogeliana* in our National Collection, now many years ago, and a year or two afterwards the disease had spread to another example on the same tablet. I have never had any specimens in my own collection thus attacked, excepting one, and that I fancy must have come into my possession diseased, and it was forthwith destroyed. But none of these are glued or affixed in any way to tablets, as is the case in most museums, but are either placed loose on cotton wool, or in glass-topped boxes. I may add that I have seen too frequently in the almost hermetically-sealed drawers under the cases in the British Museum a dulness first pervading the exterior of certain *smooth* species more markedly *e. g.*, Conus, Cypræa, and especially Naticidæ. Then grey acid efflorescence, both tasting and smelling strongly of vinegar, covers the whole surface like a powder, rising doubtless from the interior, and the specimens are soon almost irretrievably ruined. This evil being, therefore, of most serious significance, the sooner one is able to cope with it satisfactorily the better, and I am sure our best thanks are due to Mr. Byne for having been the first to take the matter in hand.

From Mr. Byne's exhaustive paper we extract the following:

"The shells which formed the subject of my experiments were from the National Collection at South Kensington, furnished me through the courtesy and kindness of Mr. E. A. Smith. These alone are referred to unless where otherwise distinctly stated. The shells in the cabinet drawers are in many instances either partially or entirely destroyed, the surface being corroded and covered with a fine white powder substance, which can be easily scraped off with a knife. This caused them to resemble Eocene mollusca.

Many species are quite unrecognizable on account of the surface being eaten away so deeply. The destruction has traveled from shell to shell and drawer to drawer, like a disease, several valuable specimens being spoilt.

The mischief has assumed large proportions, and being still on the increase causes the greatest anxiety.

The most remarkable facts are—

1. Only marine species are attacked.

2. Highly polished shells, such as those of Cypræa, are the most liable to be affected.

3. It does not extend to every specimen in a drawer, and of several mounted on the same tablet, perhaps one only is attacked.

4. Loose shells are also destroyed, but there are comparatively few of these compared with the number of those mounted on cards.

5. The shells affected are from twenty to fifty years old, but the corrosion does not appear until after the lapse of about ten years. The process is thus an extremely slow one.

6. It occurs principally amongst the shells kept in drawers in the dark, where the air is confined and seldom changed.

7. If the tongue be placed against one of the shells, an astringent alum-like taste will be observed.

We now come to the consideration of possible causes of corrosion. They appear to me to be four in number.

I. *Damp.*—If the shells were placed in a room or gallery that was not properly warmed, a very probable reason would be that a fungus had been formed, eating away the surface of the shell. The shell gallery of the Natural History Museum is, I am assured, excessively dry. This cause is, therefore, excluded.

II. *The action of sulphuric acid.*—It is well known that the atmosphere of cities contains free sulphuric acid (in addition to other sulphur compounds) derived from household fires and the burning of coal-gas. This acting over a period of years would slowly eat away the calcium carbonate of the shell, forming calcium sulphate. If this were the explanation, then the whole of the white powdery substance on the surface of the shell would consist of calcium sulphate. Analysis, however, showed that none was present.

III. *Presence of salt.*—Shells that had not been soaked in fresh water before being placed in the cabinets would contain salt, not only in the epidermis, but also held mechanically amongst the particles of calcium carbonate. It is highly probable that its presence would exert a deleterious influence.

Chemical tests showed that it was practically absent in the shells examined, a fact that occasioned some surprise.

IV. *Action of an acid substance.*—After carefully considering all the facts in my possession, I have come to the conclusion that the corrosion is due to the action of butyric acid.

Upon opening the box of shells sent me by Mr. E. A. Smith, I at once noticed a pungent vinegar-like odor, which pervaded the fingers and everything that came in contact with them. This pointed to the presence of acids of the acetic series. Analysis showed that every shell contained butyric acid, as calcium butyrate. A few contained

calcium acetate. Butyric acid is a product of the fermentation of animal matter, and its original source was found in the following manner; A specimen of *Strombus tricornis* was soaked in distilled water for a week. A piece about the size of a pea, of a grayish gelatinous substance was found at the bottom of the glass vessel. This had come from the interior of the shell, and chemical tests showed it to be organic matter. The shell had probably been more than twenty years in the Museum.

This at once furnished the explanation which I now bring forward, namely: That the pieces of the animal left in the shell, through insufficient cleaning or otherwise, ferment, setting free butyric acid. This substance is extremely volatile, and pervades the whole of the drawers and cabinets. The amount present can only be extremely small, but acting as it does for so many years, it slowly eats away the surface to a considerable extent, converting the calcium carbonate into calcium butyrate.

The reason that land and fresh-water species are not attacked is that their epidermis acts, so to speak, as a coat of mail. Hence, highly-polished species of Cypræa, etc., are the most liable to corrosion through lack of such protection.

The fact that the shells exposed to daily public inspection in the top cases are less attacked is explained on the hypothesis that the light acts as a deterrent. I have also come to the conclusion that the gum used in attaching the shells to the tablets has something to do with the corrosion. The majority of the shells affected in the National Collection are gummed to tablets. As far as can be ascertained, the corrosion has never occurred in private collections where the shells are and always have been loose. The gum ferments, acetic acid being formed. This eats away the calcium carbonate, forming calcium acetate; this latter substance was found in several of the shells examined, in addition to the calcium butyrate.

V. *Prevention.*—In the case of those shells which are badly affected, nothing can be done, and their instant removal is absolutely essential, for if left, they only increase the mischief with those just beginning to show signs of corrosion. I recommend that they be soaked for twenty-four hours in a solution of corrosive sublimate (1 part in 1,000 water) and then thoroughly dried.

As an experiment, all shells should be subjected to such treatment, in the hope that it may prove effectual. It is quite impossible to say

beforehand whether this will be an infallible remedy. Time only can prove its efficacy.

On page 235 of the same volume Mr. Byne gives the following supplementary notes to his former observations:

"At the time of writing my former paper I did not possess any knowledge of bacteriology, but I had come to the conclusion some months before that the corrosion was due originally to the action of bacteria. I am now enabled, through the kindness of Dr. Ewart, to adduce a considerable amount of evidence in support of this. I still adhere to the five items of my previous summary.

The white powdery substance upon the surface of the shells was found to consist of calcium butyrate, in some instances mixed with calcium acetate. It was formed by the action of butyric and acetic acids upon the calcium carbonate of the shell structure.

Since butyric acid does not occur in the atmosphere, it can hardly have had an external origin. It must, therefore, have been derived from fermentative processes occurring in the organic material of the shell, or of adhering portions of the molluscan inhabitant. Both aërobic and anaërobic bacteria are known which can cause various carbohydrates to ferment, producing butyric and acetic acids. It is very often the case that a portion of the liver is left attached to the shell, especially to the apex. This might easily undergo butyric fermentation, and, moreover, the same might occur with the adhesive substance used to fix the specimen to its card. Both aërobic and anaërobic butyric bacteria exist, but the common forms are anaërobic. Hence we should expect to find the danger of spoiling increased with imperfect aëration in closed or hermetically sealed cases, in which at the same time there would be no possibility of the acid products escaping. A little moisture is required to start the fermentation; hence, dry cases should escape, and even in damp air the process can only take place with great slowness, for so soon as the products accumulate to a certain extent, fermentation ceases until they have been removed.

That the mischief is of bacterial origin is supported by the following facts:

1. *Butyric acid has been found.*

This could only be produced by the butyric fermentation of carbohydrates, or even proteid substances. Acetic acid is amongst the fermentative products of butyric bacteria, and calcium acetate has been found in some of the shells.

2. *The shells in the top cases that are exposed to light are practically unaffected.*

This points strongly to bacteria. The deadly action of direct sunlight on bacteria is well known, and may produce death in from five minutes to an hour when they are in the vegetative condition. Even strong diffuse daylight suffices to retard or even inhibit the development of many bacteria.

3. *The shells in the drawers kept in the dark are the worst attacked.*

This necessarily follows from the above statement. Darkness is favorable to the development of these fermentative organisms. Within the shell the bacteria would even in the top cases be protected from the inimical effect of light.

I stated in my former paper that the corrosion had not occurred in private collections. Since its publication I have been informed that some shells in a large private collection at Birmingham have been badly corroded, and have caused anxiety for some time past.

PREVENTION.

It must surely be conceded that an infallible remedy cannot be given. My critics have either overlooked or paid no attention to the fact that the corrosion does not appear until after the lapse of about ten years.

The suggestions received are:

1. Boiling in oil.

2. Rubbing over the surface with such substances as oil of turpentine oil of cloves, and formalin.

I am of the opinion that these may be dismissed as ineffectual. Now that we know that the corrosion is caused by bacteria, I am more than ever convinced that soaking in corrosive sublimate solution, combined with previous thorough cleaning, will prove effectual. It must be remembered that corrosive sublimate is an *extremely poisonous* substance. The drawers should be thoroughly aërated at intervals, to remove accumulated acid vapors, which will never be present in more than minute traces.

The drawers should also be kept well dried.

NOTE ON THE VARIETIES OF EPIPHRAGMOPHORA MORMONUM.

BY H. A. PILSBRY.

In treating of this species both Binney and Stearns have commented on its variability. In examining the series in our collection it appears to me that three well-marked races or subspecies exist, which may be readily distinguished.

Typical *mormonum* is large and depressed, pale reddish corneous, often fading to a paler tint on the base; the brown girdle is conspicuously darker, and broadly bordered with white above and below. Surface glossy, sculptured with growth-wrinkles only, or if spiral striæ are present they are very faint; apex minutely granulose. Diam. 29–31, alt. 14–15 mm., sometimes smaller. Whorls 6.

Mormon Island, in the American River, Sacramento Co., Cal. (type locality); Tuolumne Co. (Hemphill).

Binney's figures represent Pfeiffer's type.

Var. *cala*, n. v. Smaller and less depressed; dark reddish-brown, the peripheral girdle not conspicuously darker, yellow-bordered; surface sculptured with dense minute spiral striæ; whorls $5\frac{1}{2}$; diam. 22, alt. 14 mm., or diam. 26, alt. 15 mm. Types from Big Trees, Calaveras co., Cal.; Fred. L. Button, H. Hemphill.

Much commoner in collections than the pale, glossy typical form.

Var. *buttoni*, n. v. Color as in var. *cala*, but shell more depressed, periphery more or less carinated in front, the surface studded with minute prominences which bear rather long golden-brown hairs when unrubbed; granulation of the apex more strongly developed. Whorls $5\frac{1}{2}$. Diam. 22–24, alt. $11\frac{1}{2}$–12 mm.

Nassau Valley, Calaveras Co., Button. Redding, Shasta Co.; McGregor. Probably some larger shells collected by Hemphill at Cave City, Tuolumne Co., belong to this variety, but the specimens before me are in poor condition. The largest measures 29 mm. diam.

This variety forms a transition to *E. hillebrandi*, which is only another term in the variation series, as Stearns has already remarked.

A NEW CALLIOSTOMA FROM FLORIDA.

BY HENRY A. PILSBRY.

Calliostoma Veliei n. sp.

Shell imperforate, high-conic, moderately solid, white, with a series of small, reddish maculæ at the periphery of each whorl. Whorls

nearly 7, the first one smooth and rounded, the rest lightly concave above and sculptured with four equal beaded spirals (and some interstitial threads on the last whorl or two), with a much broader, more prominent spiral rib at the periphery and projecting above each suture, where a narrower spiral shows below it; the last whorl quite convex just below the prominent rib, the base moderately convex, and sculptured with 14 beaded spirals, contiguous toward the periphery, but more separated and with interstitial threads in the intervals on the rest of the base, which is further sculptured by fine, curved, radial grooves. Three or four of the spirals are rather sparsely dotted with red. Aperture trapezoidal, white and pearly within; columella pearly, white and concave above, ending below in a slight tooth. Alt. $10\frac{1}{2}$, diam. $9\frac{3}{4}$ mm.

Caxambas Pass, S.-W. Florida, collected in 1898 by Dr. J. W. Velie, in whose honor it is named.

GENERAL NOTES.

Only a One-tenth Oyster Crop.—This has been the poorest year in ten in the oyster industry of Maryland. In years past from 5,000,000 to 10,000,000 bushels of oysters have been taken from the bay. This year the yield will be about 1,000,000 bushels.

The question of legislation for the protection of the oysters has agitated the state for years, but in the meantime the bivalve is disappearing. Notwithstanding the diminishing supply, however, there have been sufficient oysters to keep going all the packing houses in Baltimore, which employ about 5000 people. Nearly 500 dredging boats are sailing out of Baltimore.—*Phila. Record, Dec. 30.*

Bivalve Shells Used in Manila for Window Panes.—In Manila, where there is an interesting field open to the naturalist, the natives have an odd substitute for glass. It is a bivalve shell of about nine inches of surface, so transparent that print can be readily seen through it, and admitting a mellow light in a room where it is used as window glass. The shell is an attractive object, flat, and in appearance resembles isinglass. One could almost imagine that it was some skillful invention of the natives, could not the growth rings be readily observed. The outer side of the shell is perceptibly rough, while the interior is perfectly glazed over and in the light has the pearly lustre found in many of the thin-shelled, oyster-like mollusks

of the tropics. The shell is the *Placuna placenta* of science, and is well known in China, the common name being the Chinese window oyster. It is employed there also for windows and used in lanterns. The Chinese grind up the shell and make from it the silver paint so common in their water colors. The bivalve is very common in the Philippines, and forms a very good and cheap substitute for glass.—*The Phila. Record.*

Unionidæ in a Tunnel.—I am interested in two examples of *Margaritana margaritifera* var. *falcata*, taken in a water tunnel near Santa Cruz, in this state (California), 700 feet from the mouth of the tunnel, and 300 feet underground. They differ from the normal specimens in being both unusually large and thin, the nacre being very richly colored.—Fred L. Button.

Purpura coronata Lam. in America.—This well-known West African species has been reported from Demerara and Trinidad by the Rev. A. H. Cooke. Living specimens were collected at Livingston, Guatemala, in the spring of 1899, by Mr. Silas L. Schumo, and are now in the collection of the Academy.—H. A. Pilsbry.

Additional Chitons from the Pliocene of the Caloosahatchie River, Florida.—In recently working over (with the assistance of Mr. E. G. Vanatta) a lot of fine material, mostly obtained in cleaning the larger mollusca, collected by the late Dr. H. E. Griffith, ten valves of Chitons were found. These were kindly studied by Dr. Pilsbry, with the following results:

Chætopleura apiculata Say. One head and two central valves.

Ischnochiton papillosus C. B. Ads. Two central valves.

Ischnochiton striolatus Gray. One head and one central valve.

Acanthochites pygmæus Pilsbry. One central valve.

The two other central valves were too imperfect for determination.

Isch. striolatus has only been recorded recent from St. Thomas and Barbados.

Dr. Dall, in his work on the "Tertiary Fauna of Florida" (Trans. Wagner Free Inst. Sci., Vol. III, pt. 2, p. 435), records but one species, *Acanthochites spiculosus* Reeve; "A fragment of a central valve," "too imperfect to make the identification certain."—C. W. Johnson.

NOTES ON VERONICELLA.—In Journ. Institute of Jamaica, Vol. 2, p. 601 (1899), Mr. H. Vendryes publishes without descriptions the names of two varieties of *V. sloanii* credited to me. I had not intended to publish these names, as they seem to represent mutations only, but since they are published, it may be well to explain that v. *maculata* is F, No. 24, and v. *subpallida* is G, No. 20, of Ckll. & Larkin's paper on the Jamaican species of *Veronicella* in Journ. of Malacology, Vol. 3, pt. 2, 1894. Mr. Vendryes lists *Limacellus lactescens* from Jamaica, but it belongs to North America, and has not been found in the West Indies. When the locality of it was unknown, I guessed that it might possibly have come from Jamaica, along with the *Veronicella* described at the same time by Blainville. Dr. Simroth has lately (cf. Zool. Record for 1898, Mollusca, p. 62) applied the name *decipiens* to an African *Veronicella*. This must be changed, as Semper has used the same name for a South American species.—T. D. A. COCKERELL.

My friend, F. W. Kelsey, of San Diego, Cal., recently sent me a peculiar Lithophagus, taken near that city, which I at once recognized as a *Myoforceps*, and Dr. Dall afterwards kindly determined the species as *M. aristatus* Dillwyn. The finding of this interesting species, with its elongate, crossed ends, in shell ground which has been well worked for so many years, is worthy of note and to the credit of the enthusiastic collector named. The fact that mature specimens are found imbedded in hard rock is proof that it is not of very recent introduction.—FRED. L. BUTTON.

PUBLICATIONS RECEIVED.

SYNOPSIS OF THE RECENT AND TERTIARY LEPTONACEA OF NORTH AMERICA AND THE WEST INDIES. By WM. H. DALL. (Proc. U. S. Nat. Mus., vol. xxi., pp. 873–897, plates 87 and 88, 1899.)

"The Leptonacea form a very interesting and puzzling group. Their characters combine features characteristic in other Teleodonts of immaturity, with such as are more probably due to environmental modifications. Without being in themselves prototypes, they exhibit features which we may readily suppose might have been characteristic of prototypic Teleodonts. Groups which are really

starting points for numerous subsequently developed genera, are usually notable for their tendency to vary and interchange characters. In the present case, perhaps, the very general habit of commensalism or parasitism, has produced degeneration, accompanied by a revival of atavistic primary characters."

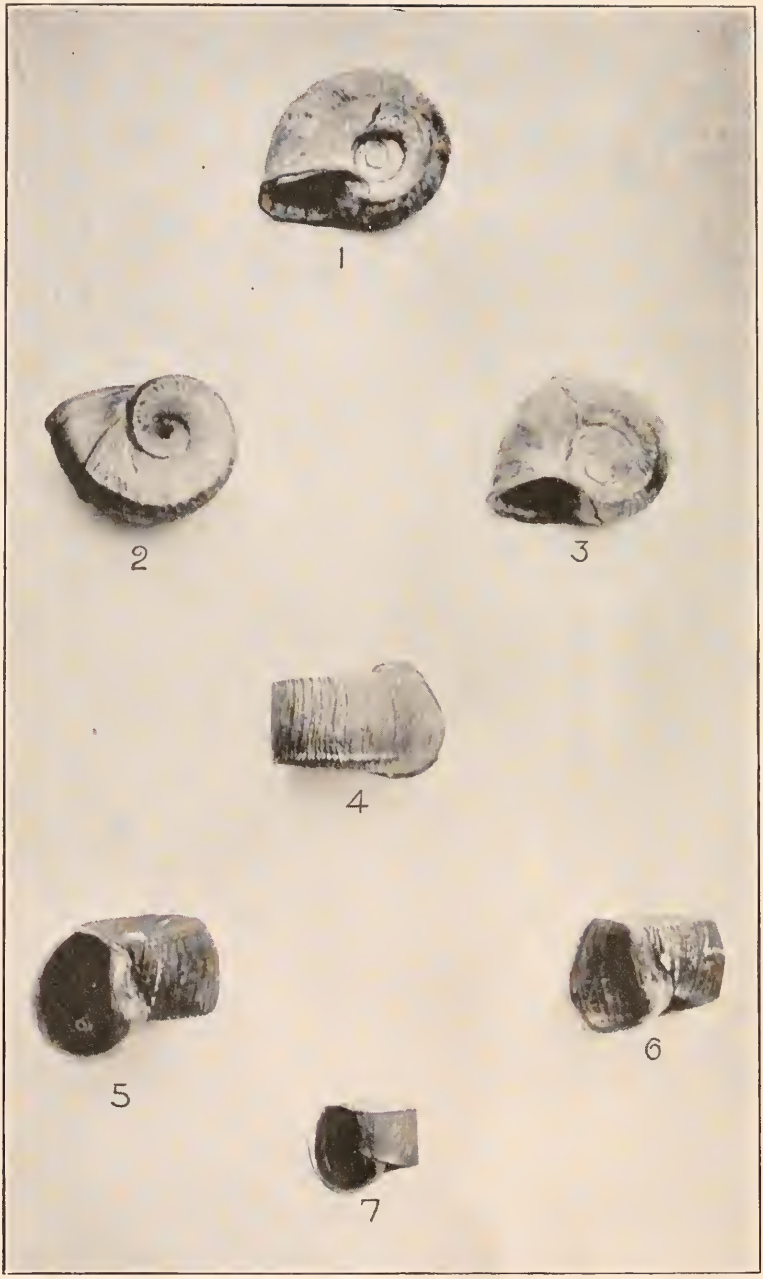
Other introductory remarks are followed by a list of species from the east and west coasts of North America, with synonymy and distribution. From the east coast there are recorded 13 genera, 34 species and one variety; from the west coast 12 genera, 33 species are listed.

A list of the tertiary species of the United States is also given, containing 73 species, divided among 13 genera, followed by "descriptions of new species and remarks on others imperfectly known." 18 new recent species are described, all of the new species are included in preceding lists. On plate 87 is shown a crab (*Gebia pugetensis*, Dana), with *Erycina rugifera*, Carp., attached by its byssus to the underside of the abdomen of the crab. C. W. J.

The Mollusk Fauna of the Pribilof Islands.—By Wm. H. Dall. (Extracted from The Seals and Fur-Seal Islands of the North Pacific Ocean, Pt. III, pp. 539–546, 1899.)

A very interesting paper on the geographical distribution of species and the physical characteristics of the region. The faunal summary gives a total of 86 forms. Only three land shells are known from the group: *Succinea chrysis*, *Vitrina exilis* and *Pupa decora* var.? A faunal summary of the Commander Islands given for comparison, shows a total of 74 species from those islands, including six land and three fresh-water forms: *Limax hyperboreus*, *V. exilis*, *H. radiatula*, *Conulus fulvus*, *Patula ruderata* var. *pauper*, *P. decora*, *Limnæa ovata*, *L. humilis* and *Pisidium æquilaterale*. Fossil mollusks were found only on St. Paul Island.

Description of a New Genus, Austrosarepta, and Notes on other Mollusca from New South Wales. By Charles Hedley. (Proc. Linn. Soc. N. S. W., pt. 3, pp. 429–434, Dec. 1899.) Following Dr. Dall's classification, Mr. Hedley places this interesting genus in the subfamily *Sareptinæ;* the type is a new species *A. picta*. A new species, *Teinostoma starkeyæ*, is described and figured. *Solen sloanii* Gray, *Neritula lucida*, *Cassis nana* T. Woods, *Cantharus waterhousiæ* Braz., are also figured.—C. W. J.



PLANORBIS CORPULENTUS SAY.

The Nautilus.

Vol. XIII. APRIL, 1900. No. 12.

THE GENUINE PLANORBIS CORPULENTUS, SAY.

BY BRYANT WALKER.

The sound judgment and critical acumen of that great naturalist, Thomas Say, has been exemplified not only in the large proportion of his species which have withstood the scrutiny of the "higher criticism" of the modern school of conchologists, but also by the number which in recent years have been rescued from the synonymical boneyard, to which they had been relegated by his immediate successors, and restored to their original integrity.

The fine species which he described in 1824 as *Planorbis corpulentus* has been one of the most unfortunate of these forgotten species in its scientific history. Owing, no doubt, in a large measure to its extreme rarity, it has been constantly misapprehended, not only by all the descriptive writers, but by nearly every one who has had occasion to refer to it.

The earlier American conchologists were unanimous in referring to it unusually large specimens of *P. trivolvis*, and generally considered it a form of that species and doubtful, even, of varietal rank.

In 1841, Haldeman referred to it a large *Planorbis* collected by Nuttall, in the Lewis river, Oregon, and his example was followed by Gould, Chenu, Clessin, Tristram and Sowerby. W. G. Binney (1865) was "inclined to believe that Say had before him a form of *P. trivolvis* when he drew his description of *P. corpulentus*," and considered the west coast species referred to that form by Haldeman,

Gould and others, to be a distinct species. It is evident from the museum register given by Binney, that he had no Canadian examples of the species before him, although he remarks that he "had seen no specimens from the localities visited by Mr. Say while on Long's expedition that were not forms of *P. trivolvis.*"

Tryon, in his supplement to Haldeman, affirmed Binney's opinion, referred *corpulentus* to *trivolvis*, and described the western form as *P. binneyi.*

This decision, so far as it differentiates the west coast form from Say's *corpulentus*, is undoubtedly correct, and all the west coast citations of that species must be eliminated.

Following the lead of eastern naturalists, the species has been cited either specifically, or as a variety of *trivolvis* in many of the eastern local lists, but without description or remarks. Such are Anthony, "Cincinnati;" Wheatley, "New York to Ohio;" Hubbard, "Ohio," and Lewis, "Little Lakes, N. Y."

Jay is the only one of the eastern cataloguers who appears to have had a specimen from near the original locality, and which possibly may have been true. He gives the locality of his example as "Winnepeck river."[1]

It follows therefore that all the citations of this species from the eastern and central states must also be rejected.

There thus remain for consideration only the few citations from the Manitoba region of Canada and the northern central part of the United States. Say's original description cites the Winnepeck river, Winnepeck Lake, Lake of the Woods and Rainy Lake. Dawson in the "Report of the British North American Boundary Commission," quotes it from Flag Island, Lake of the Woods, and remarks that "the specimens are from Say's typical locality and agree perfectly with his description. If *P. corpulentus* is a variety of *trivolvis*, as has been suggested, it is a very well marked one, and is characteristic of the open reaches of the lake."

[1] Part of Say's collection is now in the American Museum of Natural History of New York. Mr. R. P. Whitfield, the Curator, writes: "We have in the Say collection one shell from the Winnepeck river, but it is not the one figured by Say in Long's Expedition, but is smaller, lacking the outer volution as compared with that figure. We have one *quite large* specimen from the J. J. Cooke collection from Lake Superior, and four specimens from the W. A. Haines' collection, which are labelled Winnepeck river. But I can find no evidence as to who collected them or where."

Grant in the "Sixteenth (1887) Annual Report of the Geological and Natural History Survey of Minnesota," cites it from "Vermilion Lake and all over St. Louis and Lake Counties," and says: "it is found clinging to rocky shores and reefs, and seems to seek places where the water is quite rough."

Hanham in his recent "List of the Land and Fresh-water Shells of Manitoba," published in THE NAUTILUS, quotes simply Dawson's original citation of the Lake of the Woods.

These references, with Jay's citation in his Catalogue, which possibly may be one of the original lot collected by Long's expedition, are the only ones, which I have been able to find, that can with any probability be referred to Say's species.

Having before me four different lots, aggregating sixteen specimens, of what is undoubtedly the genuine *corpulentus* of Say, I can confidently affirm that the species is entirely distinct from *P. trivolvis*, and must be accorded specific rank.

Say's description is very exact, and when read so as to apply to a a sinistral species, as this undoubtedly is, as shown by the young shell (fig. 7), leaves but little to be added.

The characteristic features of the species are the high, narrow, bicarinate, rugosely striate whorls, with widely separated raised growth lines and large expanded aperture, which is higher than wide. The superior surface is either almost perfectly flat, or more or less concave, sometimes deeply so, varying as the shell is coiled horizontally or somewhat obliquely to the axis; the superior carina, until the last half of the last whorl is reached, is almost a right angle, the sides of the whorl being but little convex, with the greater convexity below the middle; the body-whorl enlarges very rapidly during the last half of its growth, and become more ventricose, and both carinæ become less prominent; the superior, however, retains its position and sensibly modifies the shape of the aperture, while the lower one from the rounding out of the base of the shell, becomes subobsolete and does not affect the convexity of the lower part of the lip; the umbilicus is large and crateriform, the base of the shell until the body-whorl begins to enlarge towards the mouth being flat, and slopes sharply from the carina into the umbilicus, so that the lower carina, during that period of growth, is much more acute than the superior one; the whorls of the young shell are very narrow and high, and owing to the rapid increase in height in proportion to width, the col-

umellar insertion of the lip is on the base of the preceeding whorl between the umbilicus and the lower carina (fig. 7), which thus forms a strong spirally entering fold slightly below the centre of the inner margin. Compared with this species, *P. trivolvis* is distinguished by its greater width in proportion to its height, wider and more convex whorls, finer and closer striæ, wider and more oblique aperture, less prominent superior carina, which is nearly central on the penultimate whorl, the constantly rounded base of the whorls in all stages of growth, never sharply and acutely carinate as in *corpulentus;* and smaller umbilicus, not exhibiting the apical whorls.

The specimens before me are from the following localities:

1. Michigan. Coll. University of Michigan (figs. 1, 2 and 3).

Exact locality and collector unknown. These specimens have been in the University museum for many years, and no further information in regard to them is attainable. They are much heavier and thicker than those from the other localities represented, but are otherwise very similar. In all probability they were part of the material turned into the museum from one of the early geological surveys, and quite likely are from the western part of the Upper Peninsula, as nothing like them has been found in the upper part of the Lower Peninsula, or in the eastern portion of the upper. They were originally catalogued as *P. trivolvis* Say.

2. Rat Portage, Keewatin, Manitoba.

Coll. Fred'k Stearns. Collected by A. C. Lawson in 1884.

3. Vermillion Lake, Minn., (fig. 4, 5 and 6).

Received from H. F. Nachtrieb of the Geol. and Nat. Hist. Survey of Minn.

4. Vermillion Lake, Hudson Bay Territory (fig. 7.)

From the collection of the late Dr. James Lewis. Collector unknown.

Mr. J. F. Whiteaves, of the Geological Survey of Canada, has kindly furnished the following data in regard to the material belonging to the Survey:

"In the Museum of the Geological Survey of Canada, there are five typical examples of *Planorbis corpulentus* collected by Dr. James Fletcher, in 1882, at the Lake of the Woods; by A. C. Lawson in 1884, at Rat Portage, above the Falls, and by W. McInnes in 1890, at Greenwater Lake, Thunder Bay District. There are also specimens which are at least very similar to *P. corpulentus* in the same

museum, collected by J. B. Tyrrell, in 1879, at McLeod Lake and by Dr. G. M. Dawson, in 1889, at Nicola Lake, both in British Columbia.

"I have never seen any of the land or fresh water shells referred to by Dr. Dawson in his Brit. N. Am. Bound. Report, and believe that they went to the British Museum."

Rev. George W. Taylor of Nanaimo, B. C., writes that a pair of the shells collected by Lawson are the only ones in his collection and that "the large *Planorbis* occurring on this (western) side of the Rockies is *P. ammon*."

In conclusion, therefore, it may be said that *P. corpulentus* Say, is a valid species and entirely distinct from either the eastern *P. trivolvis* on the one hand, or the western *P. ammon* or *binneyi* on the other; that it is a characteristic form of the Manitoba lake region, and extends from there into northern Minnesota and Michigan. Nothing is known in regard to the animal.

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1859 Cooper—Rep. Moll. P. R. R. Survey 378.
1861 Tristram—Cat. Coll. T. and F. Moll. in Guatemala, P. Z. S. 231.
1864 Carpenter—Sup. Rep. Moll. W. Coast of N. A. pp. 532, 558, 599, 607, 675.
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NEW SOUTHERN UNIOS.

BY BERLIN H. WRIGHT.

Unio Kingii, sp. nov.

Shell small, moderately thin, plicate behind, inflated, elliptical and very inequilateral. Epidermis dark yellow and covered throughout with fasciculated rays, which are more or less interrupted, forming arrow-shaped markings. Sides rounded, and with a slight enlargement from umbo to base, causing a slight emargination behind it. Beaks quite prominent and surrounded by ten or twelve fine, irregular, broken concentric folds. Umbonal ridge well defined and the terminus of all the knotty plications that thickly cover the posterior area. Lateral teeth slender, straight and quite smooth; cardinals erect and well roughened. Anterior cicatrices scarcely distinct and often confluent; a deep extension running well under the cardinals. Beak cavity slight; cavity of shell profound and uniform. Nacre variable, from greenish gray to rose. Width, $1\frac{5}{8}$ in.; length, $\frac{3}{4}$ in.; diam. $\frac{5}{8}$ in.

Habitat. A branch of the Flint R. in Baker Co., Ga.

Type lot in National Museum.

Remarks: Affinity, *Unio Walkeri*, Wrt. and *U. penicillatus* Lea. From the former they are easily distinguished by their greater inflation and rounded sides, and more rounded umbonal angle, the finer and rougher plications and diminished length; from the latter it is also more inflated, darker and coarser, and has a sharper umbonal angle. In some specimens the rays almost disappear, and again are so dense as to give a green appearance to the shell.

Mr. Charles T. Simpson has compared the type lot with the Lea types and considers it nearer to U. penicillatus Lea than to Walkeri, but sufficiently distinct from both to warrant the standing we here give it. Mr. Simpson also suggests a generic name, by which this group will be distinguished in his forthcoming Synopsis of the family.

It affords me pleasure to name this species for the discoverers,

Messrs. G. F. and B. H. King, who take great interest in natural history, and who are about to engage upon a thorough exploration of S. W. Ga. and W. Fla. in the interest of science. Their address is Mimsville, Ga.

NOTES ON SOME SOUTHERN MEXICAN SHELLS.

BY HENRY A. PILSBRY.

A small collection of shells from the state of Tabasco, Mexico, received from Prof. José N. Rovirosa, is interesting as supplying a new species of the genus *Chondropoma*, a genus common to southern Mexico and the West Indies, but far more fully developed in the latter region.

A new *Unio* of the *Lampsilis* group also occurred. The following is a list of the species:

Polygyra Yucatanea Mor. var. *helictomphala* Pfr. San Juan Bautista.

Thysanophora conspurcatella Morel. San Juan Bautista.

Oxystyla princeps Brod.

Subulina trochlea (Pfr.). San Juan Bautista.

Opeas micra (Orb.). San Juan Bautista.

Glandina Ghiesbrechti Pfr.

Succinea Guatemalensis Morel.

Planorbis tenuis Phil.? (Young.)

Planorbula obstructa Morel. Margin of the Grijaloa R.

Aplexa aurantia Cpr. Macajuca.

Aplexa Tapanensis Cr. & Fisch. San Juan Bautista.

Chondropoma Martensianum Pilsbry. Montañas de Poaná. See below.

Helicina lirata Pfr. Garden of the Juarez Institute, San Juan Bautista.

Neritina virginea L. Pueblo "La Ceiba."

Pachychilus vulneratus Crosse & Fischer. Upper Puyacatengo R. near Teapa. This is the form referred by Morelet (in coll.) to *P. Helleri*, and made by Crosse & Fischer a variety of *P. chrysolis* Brot., under the above name. The form seems to offer considerable differences from *P. chrysalis*, typical specimens of which were collected by Sr. Rovirosa at Ixtacomitan, Chiapas, and it may prove specifically independent. The specimens are old, more truncated

than any other *Pachychilus* I have seen, one with a greatest diameter of 24 mm., measuring 39 mm. in height, and having less than two whorls remaining, the suture describing only one spiral turn. The shells from Morelet's collection before me are much smaller, though doubtless this exact form.

Unio Rovirosai Pilsbry. Laguna de Atasta, near San Juan Bautista. See below.

Descriptions of New Species.

Chondropoma Martensianum n. sp.

Shell perforate, turreted, truncate, thin, corneous, with many faint reddish-brown narrow spiral bands interrupted into dots. $4\frac{1}{2}$ to $5\frac{1}{2}$ whorls remaining in adults, very convex, separated by very deeply impressed sutures, the last whorl well rounded below. Sculpture of numerous very low spiral cords, a median one often larger, giving the upper whorls a subangular appearance, crossed by very numerous vertical lamellæ with scalloped edges, about 4 or 5 lamellæ in the space of a millimeter, on the latter half of the last whorl. Aperture circular; peristome broadly and equally reflexed on the outer, basal and columellar margins, its face somewhat lamellose, nearly 1 mm. wide.

Alt. 13, diam. 6.6, internal diam. of aperture 3.2 mm. ($5\frac{1}{2}$ whorls.)

Alt. 11.3, diam. 6.5, internal diam. of aperture, 3.3 mm. ($4\frac{1}{2}$ whorls.)

Montañas de Poaná, Tabasco, Mexico (José N. Rovirosa).

This species is most nearly allied to *C. radiosum* Morelet, but differs as follows: It is smaller and more slender; the lamellæ are not produced into short spines where they cross the spiral cords; the peristome is decidedly narrower, recurved instead of flat or flaring forward; finally, the aperture itself is as large as in *C. radiosum*, though the shell is smaller.

It is named in honor of Dr. E. von Martens, who is now publishing an extensive work on the non-marine mollusks of Mexico.

Unio (Lampsilis) Rovirosai n. sp.

Shell large, ovate, rather thin (about as in *U. luteolus*), inflated, nowhere gaping, covered with a rather thin black cuticle, sculptured with coarse and irregular growth-wrinkles, lamellose toward the basal margin; beaks rather small, situated a little behind the anterior

fourth of the length; hinge margin slightly curved, anterior end narrowly rounded, posterior end much wider. Interior white, faintly pink tinted in the cavity, hardly iridescent. Right valve with one strong wedge-shaped cardinal tooth standing nearly at a right angle to the larger axis of shell, slight rudiments of accessory teeth in front of and behind it on the hinge-line; the lateral single, stout and high, separated by nearly its own length from the cardinal. Left valve with two stout, subequal, oblique, crenulated cardinal teeth and two strong laterals. Anterior adductor and pedal scars deep, posterior scars very shallow, the adductor and foot retractor completely united. Dorsal scars well within the cavity of the beaks, the major row (of about 6–8 small deep scars) extending obliquely across the cavity from below the cardinal to the lower side of the hinge-plate; some smaller, shallower scars below the main series. Pallial line deep anteriorly and below, shallow posteriorly. Length 111, height 71, diam. 43 mm.

Laguna de Atasta, near San Juan Bautista, Tabasco, Mexico.

Type is a ♀ specimen. It is allied to *U. umbrosus* Lea, differing in the narrower anterior end and consequently triangularly oblong form, the hinge-line and basal margin converging strongly forward; the lateral teeth are also shorter. The female is much more swollen posteriorly than in *U. umbrosus*.

It is named in honor of Prof. José N. Rovirosa, known for his botanical explorations in southern Mexico.

This species falls into the genus *Lampsilis* as understood by Simpson. Pending the publication of his classification of the group, it is here placed under *Unio*.

SOME NOTES ON THE LAND SHELLS OF WESTERN FLORIDA.

BY C. W. JOHNSON.

The following notes on the land mollusca are based on a few obtained incidentally while collecting fossils in Western Florida during the latter half of February and the first week in March.

These notes give a more southern and western distribution for a number of species than has heretofore been recorded.

The more southern distribution is undoubtedly due to the direct southerly course of all the rivers, which during freshets carry down great quantities of drift-wood to which a number of the land shells

usually cling for preservation. A more western range for a number of the eastern species would be expected, and more thorough and extended researches would probably show a much greater distribution westward.

In the woods just east of Tallahassee, among the leaves around the foot of some large magnolias and oaks, a number of *Polygyra pustula* and *P. hopetonensis* and a few *Omphalina lævigata* and *Strobilops labyrinthica* were found. Near by in an old decayed log were found *Glandina truncata* (young), *Vitrea indentata*, *Zonitoides arboreus*, *Z. milium* and *Philomycus carolinensis*.

At Jackson's Bluff on the Ocklocknee river, 24 miles west of Tallahassee, is a fine exposure of the Chesapeake miocene. Here a few favorable logs and stones were hastily turned over; under the limestone was found *Helicina orbiculata* and *Glandina truncata*, while from the logs were taken *Omphalina lævigata*, *Gastrodonta suppressa*, a form in which the umbilicus is but slightly perforate, *G. demissa*, *Vitrea indentata*, *Helicodiscus lineatus* and *Polygyra inflecta*; for the latter species this is a more southern locality than has previously been given.

Two miles below Jackson's Bluff is Larkin's Bluff; under some boards and wood near the Bluff only *Polygyra hopetonensis* was found; this is the most western locality from which I obtained this species.

About half a mile below Bailey's Ferry, on the west side of the Chipola river, 11 miles west of Blountstown, is the farm of Mr. J. P. McClellan; here the Chipola bed comes to the surface and the shells are ploughed out in the field. After obtaining a fine lot of the Chipola fossils and several boxes of the marl from which the clay and sand had been washed through a seive, I turned over an old log, just as I was leaving, and found *Gastrodonta intertexta*, the strongly carinated form, but with the usual internal callus. *G. demissa*, the most southern locality from which this species has been recorded. *Polygyra appressa* var. *perigrapta*, formerly recorded only from the mountainous portions of Tennessee and adjacent States, *P. inflecta*, and *P. pustula*, which has not before been reported west of Cedar Keys. In crossing the field near by I found an immature specimen of *P. albolabris*.

While waiting for the steamboat at Blountstown a short stroll was taken through the woods; a search beneath the oak logs disclosed a number of *Polygyra fallax*. It seemed strange how these were confined exclusively to the oak; numerous pine logs were turned over, close by the oak, and all conditions seemed equally favorable, but not a single shell was obtained. *P. fallax* has not to my knowledge been recorded south of northern Georgia. Under the bark of logs, in the drift along the Apalachicola river, was the ever present *Zonitoides arboreus*.

As the steamboat did not connect with the east-bound train, I was obliged to go to Marianna for the night. I had noticed from the car

window the week before an outcrop of limestone at the railroad bridge across the Chipola river, one mile east of town, that I wanted very much to examine, so before train time, the next morning, I made a grand rush for the river. The nummulitic limestone contained but one mollusk, *Pecten perplanus*, but what it lacked paleontologically, it made up malacologically in furnishing a suitable environment for numerous species of snails. A glance showed it to be an ideal collecting ground; limestone, moisture, a varied vegetation, a cave and an old quarry with moss-covered rocks in all directions, is just what the snails want, and visions of a new species or variety formed an active stimulant; for I felt sure that Hemphill, Ferriss or Sargent had not been there. But alas, while the snails were thick, a *nov. sp.* was not to be found by "dis chile." Ferriss *would* no doubt have found one, for I still believe it's there. *Pyramidula alternata* was very abundant, a coarsely sculptured and beautifully marked form, among which I found a sinistral specimen. *P. perspectiva* was also plentiful; neither of these have previously been recorded from Florida. Among the leaves in front of the cave were numerous fine specimens of *Gastrodonta demissa*, the majority of which are slightly more depressed than the typical form. *Omphalina laevigata* chiefly frequented an old log, while *Helicina orbiculata* were found among the rocks in the drier portions of the quarry. A few specimens of the following species were also obtained: *Glandina truncata*, *Zonitoides arboreus*, *Vitrea indentata*, *Strobilops labyrinthica*, *Bifidaria armifera*, *Polygyra inflecta*, *P. appressa* var. *perigrapta*, and *P. stenotrema*. The latter species have not before been recorded from Florida. In the river drift near the bridge were numerous specimens of *Polygyra auriformis* and a few *Succinea luteola*. As this drift was not the direct wash of the river, but was formed by the water backing up over the low ground along the railroad, I am inclined to think that the two species could be found living among the grass and sedge along the high-water mark.

EPIPHRAGMOPHORA HARPERI, N. SP.

BY F. W. BRYANT.

Shell unbilicate, translucent, white; suture well defined; spire a depressed cone composed of five regularly increasing convex whorls, the first three smooth, the remainder marked by obscure, closely-crowded, oblique lines of growth; base convex; aperture nearly circular, oblique; peristome thin, broadly expanded, and reflexed at lower third of baso-columellar portion, its extremities joined by an elevated ridge, bordering which is a somewhat triangular callus bounded on the inner side by a ridge extending from the middle of the base of the reflected portion of the peristome obliquely to the

upper part of the basal whorl; width of umbilicus about one-fifth greater diameter of shell.

Numerous dark microscopical lines extend from the peristome over the body whorl nearly perpendicular to the lines of growth.

Greatest diam. 17, least diam. 14, alt. 9 mm.

Locality, San Jacinto Mts., California.

A NEW N.-E. AUSTRALIAN AMNICOLOID.

BY HENRY A. PILSBRY.

The species described below was received from Mr. D. Thaanum. It is evidently referable to the genus *Petterdiella*, the synonymy of which is as follows:

Ampullaria sp., Tenison-Woods, Proc. Roy. Soc. Tasmania 1876, p. 117.

Amnicola sp. of various authors.

Brazieria Petterd, Proc. Roy. Soc. Tasm. 1888, p. 76. Not *Brazieria* Ancey, 1887 (see Man. Conch. IX, p. 29).

Petterdiana Brazier, Proc. Roy. Soc. Tasm. 1896, p. 105.

Pseudampullaria Ancey, Ann. Mus. d'Hist. Nat. Marseille I, 1898, p. 148.

All of the above names are based upon *Ampullaria tasmanica* Ten.-Woods.

Petterdiana Thaanumi n. sp.

Shell small, globose, *Ampullaria*-shaped, narrowly perforate; light brown; smooth except for slight growth-lines. Spire short. Whorls 4, quite convex, the last perceptibly flattened below the suture, globose, not angular at the periphery; narrowly excavated around the perforation. Aperture oblique, roundly ovate, narrowly rounded above; outer lip simple; columella concave, wide and flattened; parietal callus short and rather heavy, though very much less thick than in *P. tasmanica*. Alt. 3.3, diam. 2.8 mm.

Near Cairns, Queensland, Australia.

This species differs from *P. tasmanica* in having the last whorl much less dilated towards the aperture, this difference being particularly noticeable when the shell is viewed in the line of the axis from above; the aperture is consequently less ample, and the outline of the shell in a front view is more regular. There is also a fraction of a whorl more than in *P. tasmanica*, the columella is not so wide, and the callus across the parietal margin is comparatively thinner, while in *P. tasmanica* the heavy columellar callus continues across the parietal wall.

This is the second species of the genus, and so far as I know the first to be recorded from Australia.

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